THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 76: No. 25. New York, Thursday, December 21, 1905.

$5 00 a Year, including Postage. Single Copies, 15 Cents.

Library of Congress Copyright Office 18 Jul 1906-d Washington D C

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THE IRON AGE

New York, Thursday, December 21, 1905.

A Notable Mesta Corliss Engine.

The first engine of its kind ever installed for rail mill service has been designed and built by the Mesta Machine Company, Pittsburgh, Pa., for the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala. It is a Corliss compound engine with a 44-inch horizontal high pressure cylinder, a 72-inch vertical low pressure cylinder, a 60-inch stroke, and weighs complete 800,000 pounds, including a 200,000-pound fly wheel. The chaser's rail mill at Ensley, Ala., and will replace a 52 x 72 inch engine which has been found too light for the work.

Fig. 1 gives a general view of the new engine in course of construction on the erecting floor and conveys some idea of the massiveness of the design. The horizontal cylinder is of the regular Corliss engine type, cast in one piece of special grade air furnace iron.

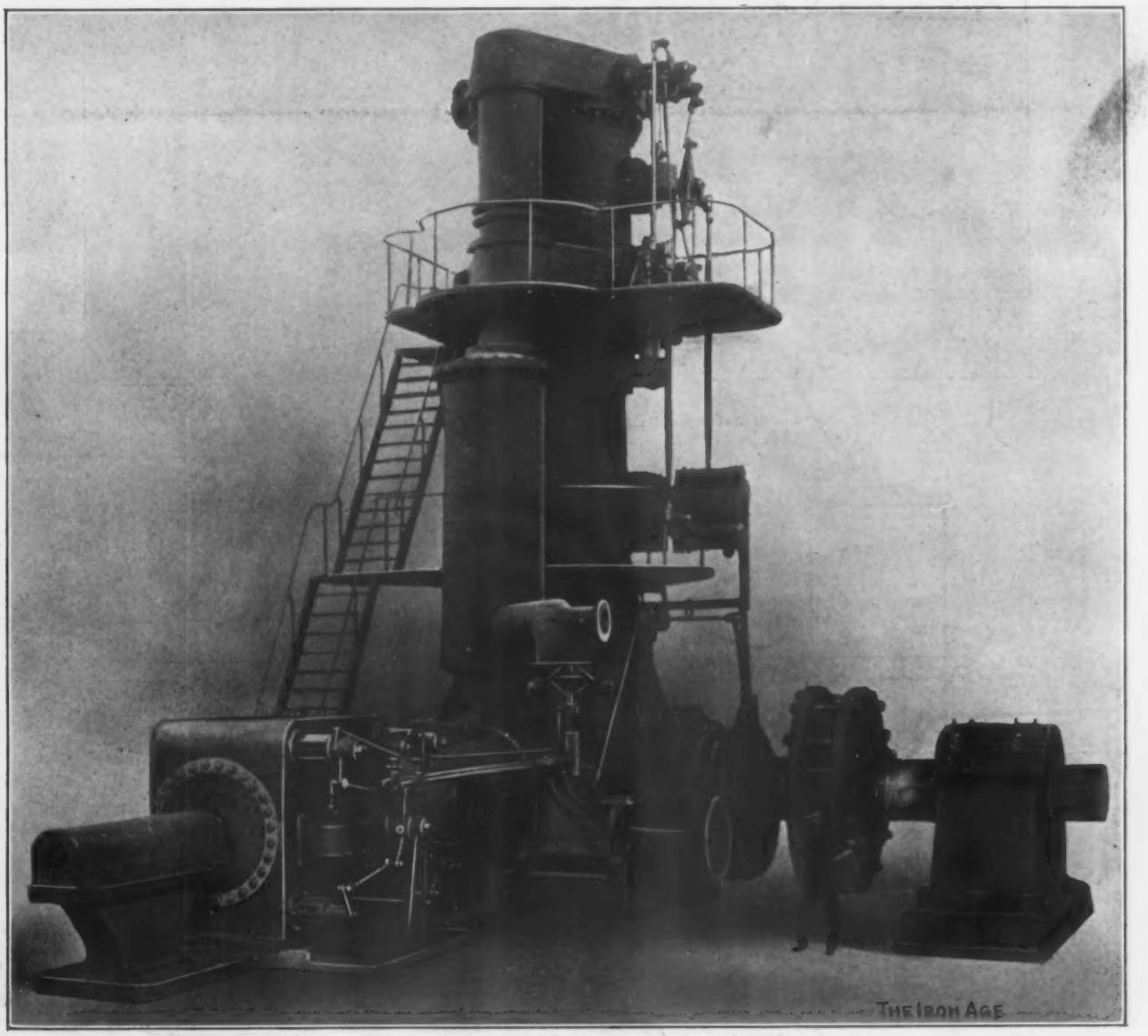


Fig. 1.—The 44 and 72 x 60 Inch Horizontal-Vertical Corliss Compound Engine Built by the Mesta Machine Company for the Tennessee Coal, Iron & Railroad Company.

connecting rods of both cylinders act on the same crank pin, and as the cylinders are at right angles to each other a quarter crank effect is secured without the use of a separate crank for each cylinder, as used on the ordinary cross compound mill engines. The engine develops 6500 indicated horse-power at a speed of 85 revolutions per minute with steam at 150 pounds pressure at the throttle and cut off in the high pressure cylinder occurring at one-half stroke. The maximum cut off is eight-tenths of the stroke and the maximum horse-power 10,000. The new engine has to meet unusually heavy demands in driving the pur-

The steam and exhaust valves are double ported and are driven by separate wrist plates. The steam arms are located inside of the bonnets and have a taper fit on the steam valve stems upon which they are forced by a sleeve and a nut at the end of the stem. The nut can be taken up while the engine is running. The dash pots are noiseless and quick acting. The high pressure piston is a solid umbrella-shaped steel casting without cored holes, finished and polished all over. The packing ring of cast iron is held in place by a cast steel follower. Spiral springs of German silver hold the packing ring against the cylinder walls. The high pressure

piston does not bear on the cylinder walls but is supported by an open hearth steel piston rod 9 inches in diameter extending through the rear cylinder head and attached to a tail rod crosshead provided with an adjustable slipper which runs on a substantial guide covered with an oil shield. The piston and cylinder are separated by a ¼-inch clearance. The only part bearing on the cylinder walls is the cast iron packing ring, making the wear in the cylinder very slight. The German silver springs are a special feature that will appeal to engineers who have had experience with steel springs in piston work, as there is no danger of the German silver springs breaking during operation and cutting into the cylinder walls. A cast iron sole plate,

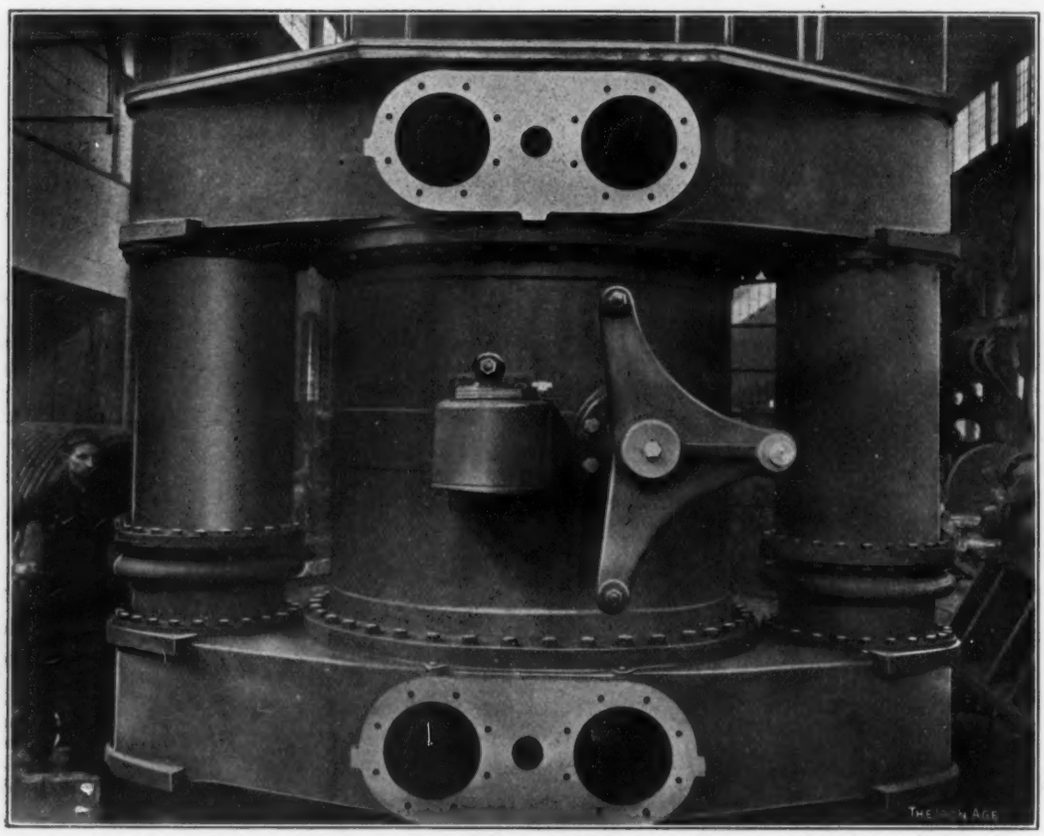


Fig. 2.—The Low Pressure Cylinder as It Appeared Before It Was Lagged.

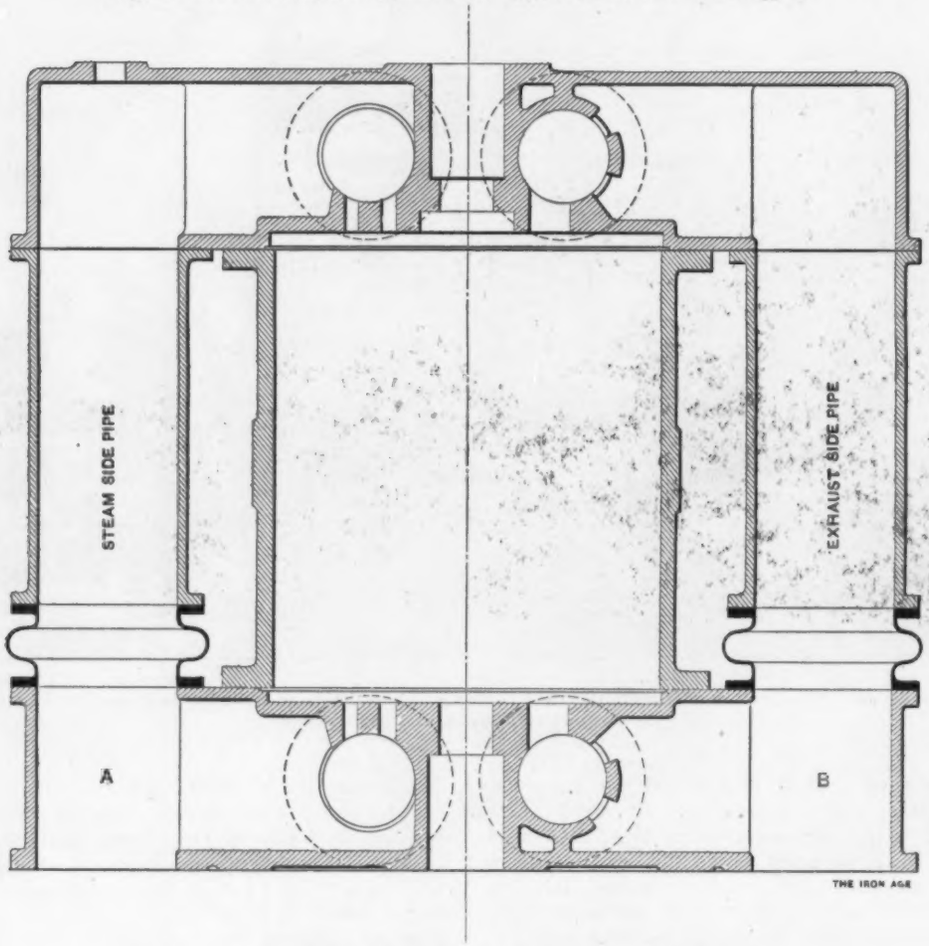


Fig. 3.—Vertical Cross Section through the Low Pressure Cylinder.

tongued and grooved, runs underneath the entire cylinder and tail rod guide, allowing the high pressure cylinder to expand and slide freely. The sole plate also serves as a drip collector for the horizontal valve gear. The high pressure guide is extended to the foundation, has a solid bottom to catch the oil drippings from the guides, the crank and the main bearing. The main bearing extends to one side of the bed plate and has a self-aligning spherical bottom shell, two side shells and wedges. The wedges enter from the top and can

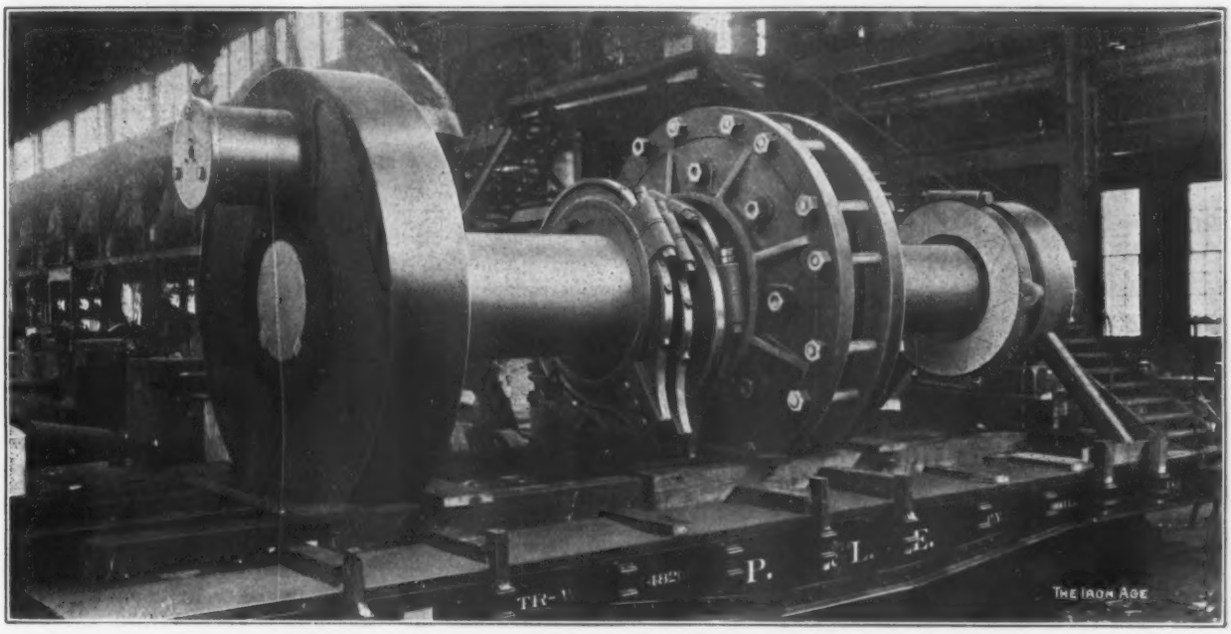


Fig. 4.—The Shaft, with Crank Disk, Eccentrics, Hub Centers and Coupling.

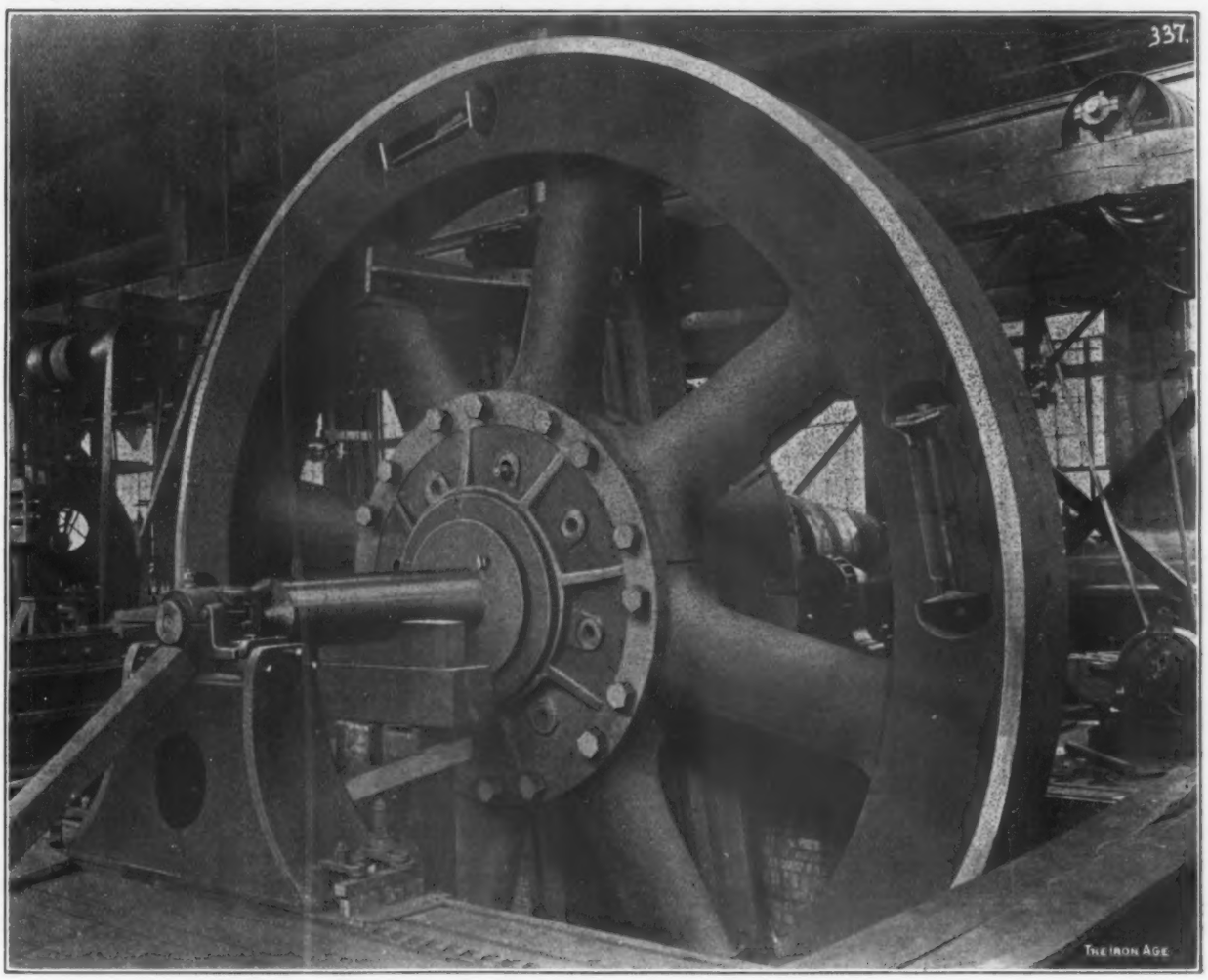


Fig. 5.—The Fly Wheel Mounted in a Pit Lathe for Turning.

resting on its wide base, and is bored for the crosshead and bolted to the high pressure cylinder at one end and to the bed plate at the other.

The bed plate is a massive rectangular casting weighing 45 tons. It forms a pit for the crank and be lifted out with the cap. The main bearing cap fits tightly over the jaws of the pillow block and on account of its weight and to facilitate handling is made in two parts, allowing each half to be handled separately. An overhead I beam and trolley are arranged in such

a way that the halves of the cap can be lifted off without the use of a crane. Each half is fastened by four heavy bolts which can be made to drop into recesses left in the foundation, thus saving lifting the caps over the bolts in taking the main bearing apart. After the cap is lifted off, the side shells and the lower shell can be removed by rolling them around the shaft, after raising the wheel and crank sufficiently to relieve the lower shell of their weight. The lower shell is cored for water cooling and is drilled and grooved for oiling under pressure from the bottom, and the caps have large openings for inspecting and feeling.

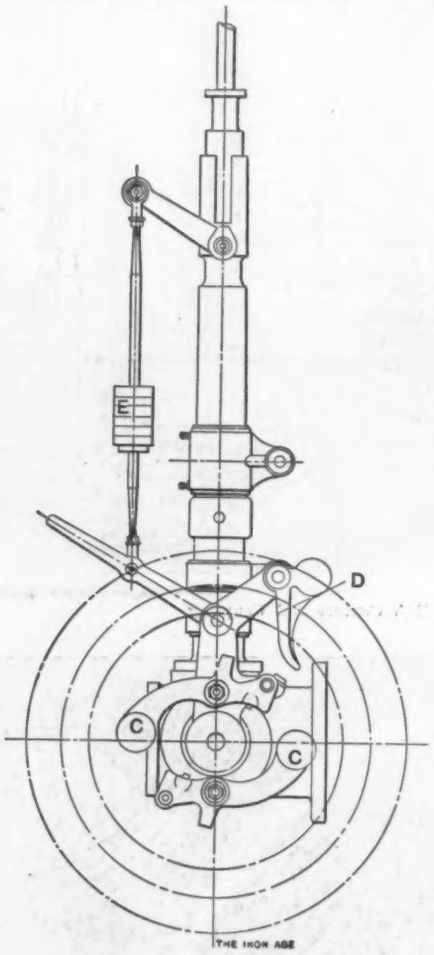


Fig. 6.—Details of the Governor.

The parts of the outer bearing are designed on the same lines as the main bearing, except that the cap is in one piece, so that it can be easily removed by an overhead crane. No liners are used in the bearings, all adjustments being made by means of screws and bolts, and the wedges, side shells and caps can be adjusted while the engine is running. The outboard bearing rests on a heavy sole plate bolted and anchored to the foundation and can be adjusted sideways by means of wedges.

The vertical frame and guide are of circular shape, the frame being bolted to the bed plate. Eight extra heavy anchor bolts, running deep into the foundation, secure the frame. The vertical crosshead guide is bored for the crosshead to the same diameter as the horizontal guide. Both crossheads are exactly alike, and like the other steel castings on the engine, such as the crank disk, the high and low pressure pistons and the high and low pressure carrier arms, are made of the best grade of Mesta acid open hearth cast steel thoroughly annealed. The tensile strength of the material ranges from 65,000 to 70,000 pounds per square inch, with an elongation of 20 per cent. The adjusting and tightening of the shoes on the crosshead is accomplished from the outside, two bolts being used for taking up the wear and one at each corner for holding the shoes to the crosshead.

The connecting rods have solid ends with phosphor bronze at the crosshead end and straps with cast steel babbitt lined boxes at the crank end. The adjustment is made by means of wedges. The crank is of the counterbalanced disk type, is pressed on the main shaft with 500 tons pressure and is secured by two keys. The crank pin, which is 20 inches in diameter by 18 inches long, is pressed into the crank and riveted over.

A view of the low pressure cylinder bare of lagging is shown in Fig. 2, giving an idea of its construction. This cylinder consists of the two cylinder heads, the barrel and two side pipes with the phosphor bronze expansion joints. The heads are box shaped castings with the port holes for the steam and exhaust valves near the center.

Fig. 3 is a vertical cross section through the cylinder which shows construction. The steam enters through the opening A from the receiver into the side pipe and the heads, through the steam ports into the cylinder, and through the exhaust ports out into the exhaust side pipe and exhaust opening B in the lower head. Both the steam and exhaust ports are double ported, which gives large port opening and quick closing with a comparatively short travel of the valve and the valve

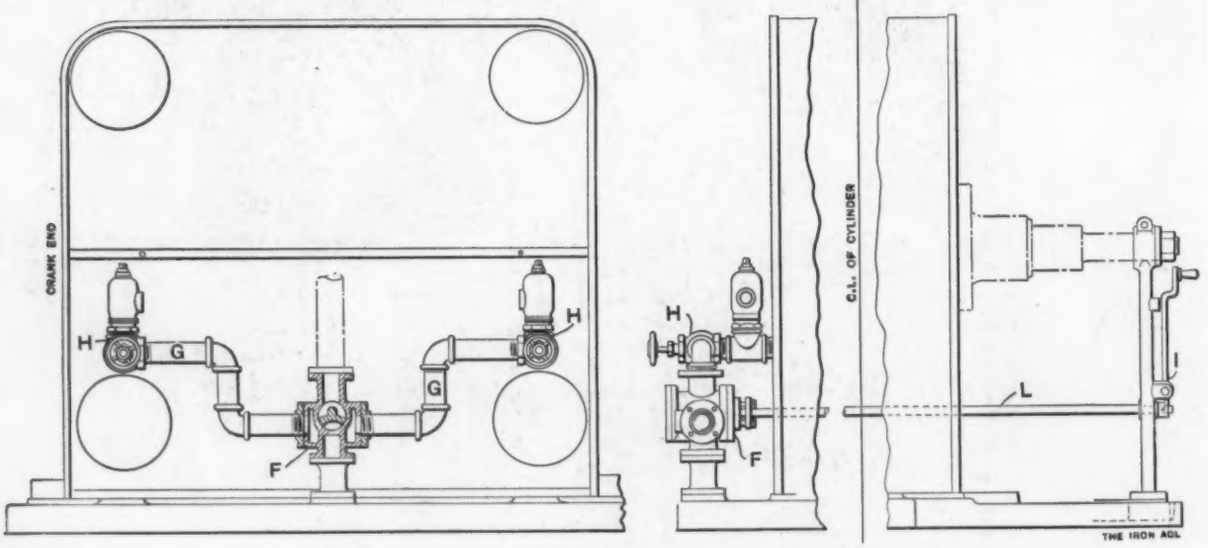


Fig. 7.—The Crank Side of the High Pressure Cylinder.

gear parts. This is of great importance on an engine running at such a high piston speed. As will be seen readily from the illustrations, no water can be entrained in the cylinder, side pipes, or heads, all these parts having wide openings at the lower end and being self-draining. The steam and exhaust valves of the low pressure cylinder, like those of the high pressure, are driven by separate eccentrics; the only difference is that

the low pressure has only one wrist plate which operates the exhaust valves, and the two low pressure steam valves are actuated direct from the carrier. On both the high and low pressure valve gears the cut off can be extended to eight-tenths of the stroke.

The low pressure piston is made of acid open hearth steel cast in two pieces; no cores are used in its construction. It has a cast steel follower and cast iron packing rings with German silver springs. Neither piston nor follower come in contact with the cylinder walls, being guided by a 9-inch diameter piston rod which runs through both the lower and upper cylinder heads.

The receiver is suspended in a vertical position under the steam side of the low pressure cylinder parallel to the low pressure guide, and is made of boiler plate with a cast steel flange at the top. It is connected to the high and low pressure cylinders and is provided

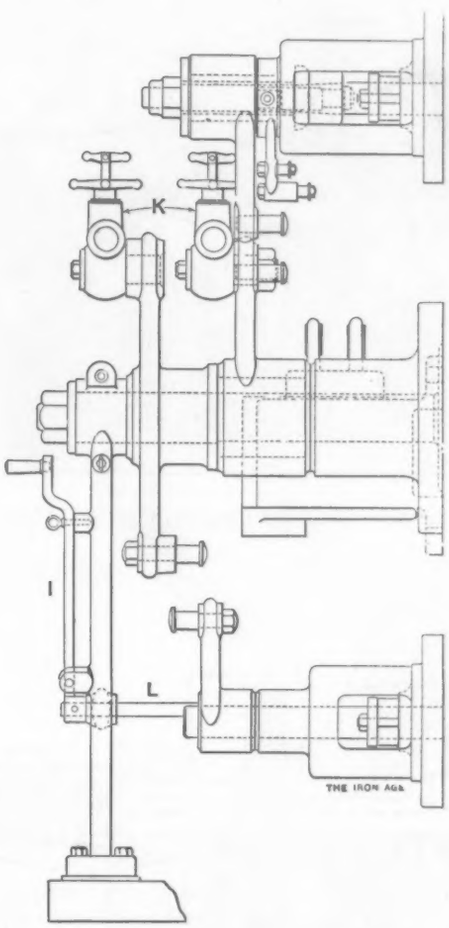


Fig. 8.—The Valve Gear of the High Pressure Cylinder.

with both a reducing and a throttle valve to let in steam at reduced pressure. The steam piping between high and low pressure cylinders is provided with two 18-inch gate valves. The whole arrangement is such that the high and low pressure cylinders can be run independently of each other. Both of the cylinders and the piping between the high pressure cylinder, the receiver and the low pressure cylinder are covered with non-conducting material. Every part of the vertical engine is made accessible by very substantial stairways, platforms and ladder.

The shaft is shown in Fig. 4, with crank disk, eccentrics, hub centers and coupling loaded on a car ready to be shipped. It is made of the best grade of open hearth forged steel. The main bearing is 30 inches in diameter by 50 inches long, the outer bearing is 28 inches in diameter by 46 inches long, and the shaft measures 34 inches in the wheel fit. The journals are ground straight and round by a special method adopted in the Mesta shops. The hub centers are forced on the shaft with 350 tons hydraulic pressure. There are four eccentrics on the shaft, each being split so as to make them more easily removable. Heavy set screws with cupped and hardened ends hold the eccentrics to the shaft, thus making them adjustable for any valve setting that may be required. The outer end of the shaft has a cast steel coupling for connecting it to the mill and an adjustable thrust collar keeps the shaft from crowding over on the engine.

The fly wheel is shown in Fig. 5, mounted on the mandrel in a pit lathe for turning. It is built up of four segments and two hub centers, each segment consisting of two arms and one quarter of the rim. The arms are not cast together at the hub, thus avoiding shrinkage strains. The rim of the wheel is held together by T-head links made of the best Norway iron and the hub centers and arms are bolted together by heavy forged bolts which fit in reamed holes.

The governor on this engine is worthy of notice. It is of the heavy weighted fly ball type, very quick and powerful in its action, being made to meet the requirements which are imposed upon the engine under the extreme variations of load, which changes instantly from, say, 7000 horse-power to friction load frequently four or five times per minute. The governor is driven by four 1¼-inch Manila ropes, drawn tightly to avoid slip, and the shock is taken up by an idler. The rope pulley on the governor shaft is provided with a shaft governor, as shown in Fig. 6. This shaft governor, being set for a certain speed, will begin to act when the predetermined speed limit is reached, and by the action of the weights C will release the latch D, which lets the weight E drop, tripping a weight on an emergency valve which instantly shuts off the steam supply to the high pressure cylinder, thus stopping the engine.

One of the important features of this engine is the ease with which it can be started and reversed. Fig. 7 shows the crank side of the high pressure cylinder with the auxiliary steam valve F attached to the high pressure cylinder sole plate and connected by the piping C and the angle valve H to each end of the high pressure cylinder. Fig. 8 shows the valve gear side of the high pressure cylinder, in which I indicates the hand lever which actuates the valve F by means of shaft L. By disconnecting the hook rod carriers K, thereby throwing the high pressure valve gear out of commission, closing the steam and exhaust valves and by opening the valve H, the engineer is enabled to give the high pressure cylinder steam at either end and start the engine in either direction.

The Illinois Manufacturers' Association.—At the annual meeting of the Illinois Manufacturers' Association, held at the Auditorium Hotel, Chicago, December 12, officers were elected for the ensuing year as follows: President, U. G. Orendorff, Parkin & Orendorff Company, Canton; first vice-president, H. C. Staver, Staver Carriage Company, Chicago; second vice-president, A. A. Sprague, Sprague, Warner & Co., Chicago; treasurer, J. Harry Selz, Selz, Schwab & Co., Chicago. John M. Glenn, Chicago, is secretary of the association. The following directors were also elected: John E. Wilder, Wilder & Co., Chicago; John H. Pierce, Big Creek Coal Company, Kewanee; W. B. Conkey, W. B. Conkey Company, Chicago; Wm. Duff Haynie, Illinois Steel Company, Chicago; Fred. W. Upham, Upham & Agler, Chicago; C. H. Smith, Western Wheeled Scraper Company, Aurora; La Verne W. Noyes, Aeromotor Company, Chicago; A. B. Dick, A. B. Dick Company, Chicago; S. E. Bliss, Bliss & Laughlin, Harvey; Gustav Hessert, Jr., National Brewing Company, Chicago; Adolph Mueller, H. Mueller Mfg. Company, Decatur.

Wage agreements for 1906 are now being made by the American Sheet & Tin Plate Company with employees in its nonunion sheet and tin plate mills on practically the same basis as prevailed in these plants this year. At certain of the plants slight adjustments have been made owing to the introduction of improved machinery which provides greater output.

The Acme Thread Rolling Machine.

The dies constitute the feature of originality in the rotary thread rolling machine built by the Acme Machinery Company, Cleveland, Ohio, although to accommodate them the machine takes a form that is radically different from that of any other designed for the same purpose. In the process of thread rolling as ordinarily conducted the shank of the object to be threaded is rolled between two flat dies the surfaces of which have furrows corresponding to the shape of the desired thread, these being inclined by an amount determining the pitch of the thread. One of the dies is usually fixed and the other reciprocated, and their relation is such that their faces are farthest apart at the beginning of the stroke to admit the bolt blank, and as the rolling proceeds they approach one another gradually, cutting and raising the thread on the bolt. The proper condition is obtained by adjusting one of the dies so that their faces are not quite parallel. The principle of the new rotary thread roller is the same, but instead of a reciprocating flat die a cylindrical one is used that revolves continuously in one direction and a stationary segmental curved die replaces the flat fixed die.

Fig. 1 gives two views of the new machine and Fig. 2 shows an end elevation and a longitudinal section, while Fig. 3 presents details of the dies and the feeding mechanism. As in the reciprocating threaders, the piece to be threaded is rolled between the dies and it is necessary that it be introduced at precisely the right instant, so that the work done by the two dies will register and not cause crossed threads. In the reciprocating machines it is comparatively easy to provide for this condition, but to do the work in the new way a special arrangement was necessary which is brought out in Fig. 3. The rotating die A is mounted on the spindle and the stationary die is held in a block that is adjusted to the required slight eccentricity with the spindle by the two hand wheels shown in Fig. 2. A pointer on the frame playing over a scale on the segmental die holder indicates the degree of eccentricity and assists the proper setting. The bolt just before work starts upon it is held in the position C, Fig. 3, between spring actuated jaws in the oscillating carriage F. There are four instants to each revolution of the spindle, when the bolt may be correctly inserted. These correspond to the four notches in the disk E. When the work is ready the operator presses on a handle attached to the

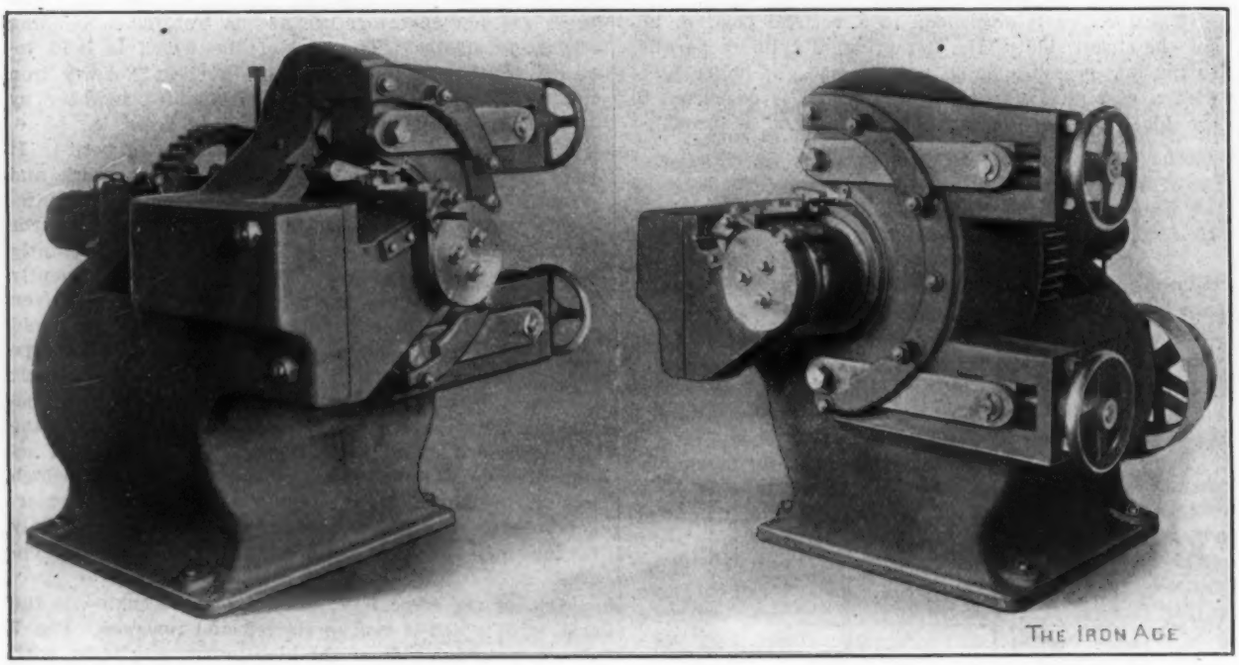


Fig. 1.—Two Views of the Thread Rolling Machine Manufactured by the Acme Machinery Company, Cleveland, Ohio.

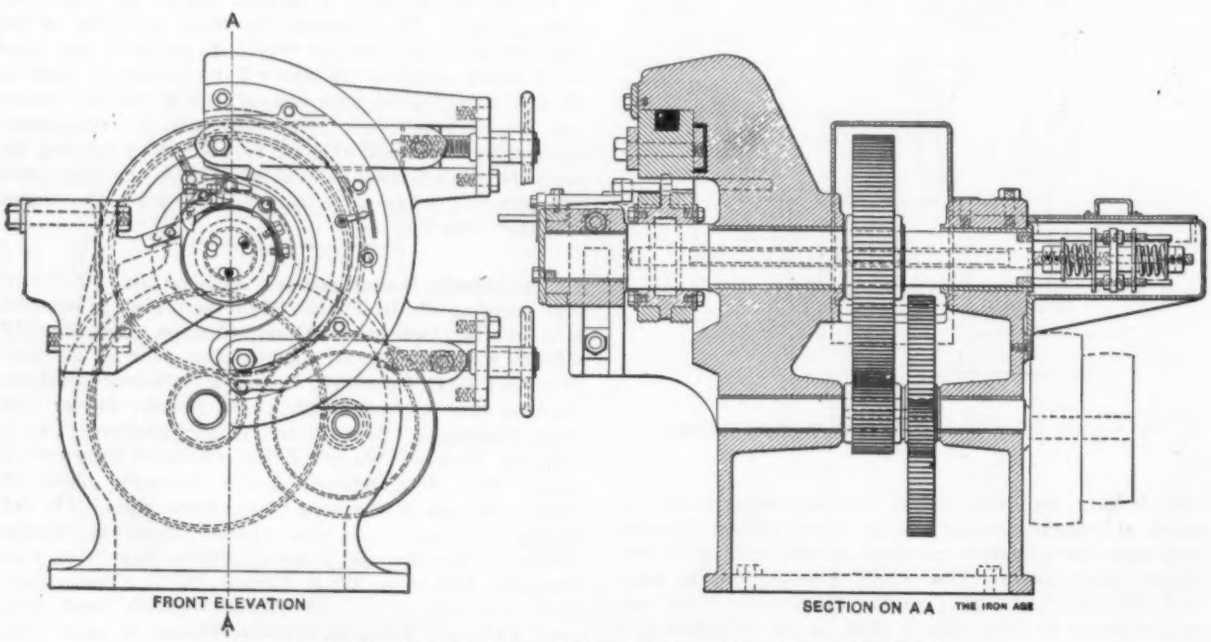


Fig. 2.—End Elevation and Longitudinal Section of the Acme Thread Roller.

pawl D, and when the next notch comes around the pawl engages it and the carriage is carried forward until the bolt is gripped by the dies and slips from the jaws, and then the carriage returns to receive the next bolt. The first bolt is carried around with the rotating die and drops out completed at the lower end of the segmental die. If the operator is sufficiently skillful a bolt may be started for each notch in the disk, but in any event he does not have to wait a whole revolution of the spindle when he is ready to enter a new blank.

An interesting provision in connection with the spindle is the automatic means for insuring perfect justification of the threads. It will be noticed in Fig. 2 that at the rear end of the spindle there are two spiral springs opposing one another in their action. These act upon a rod passing through the center of the spindle that carries a key engaging the rotating die holder. They tend to hold the die at a definite position, but at the same time allow slight axial displacement in either direction sufficient to allow the rotating die to conform with the threads started by

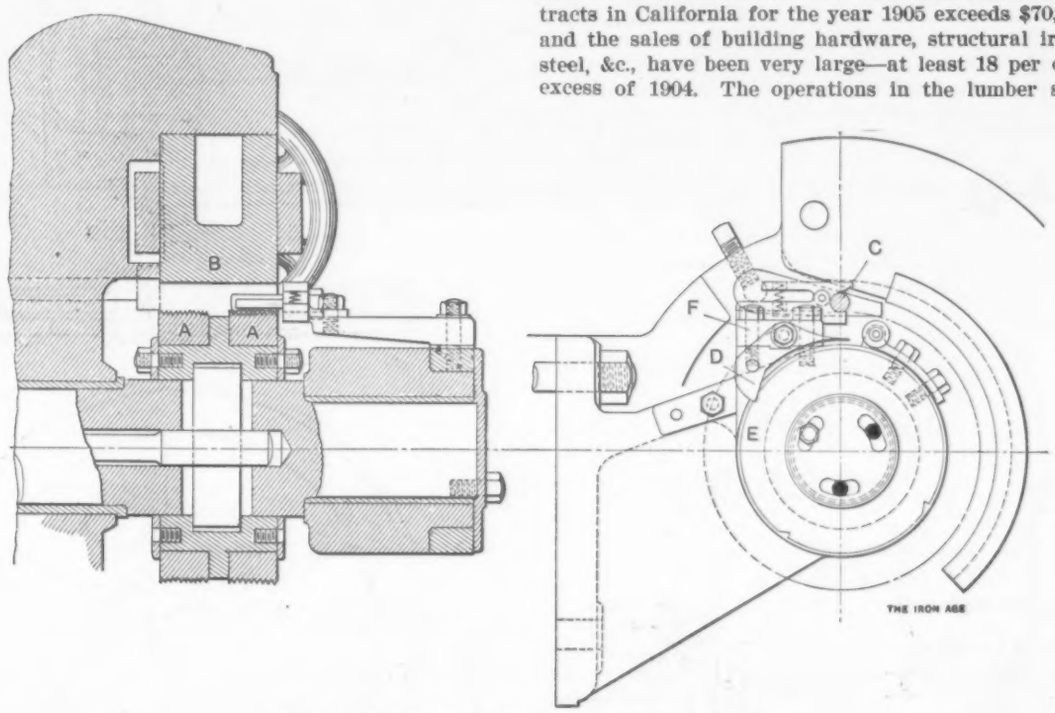


Fig. 3.—Details of the Dies and Feeding Mechanism.

the stationary die. The notched disk E is adjustable angularly to correctly time the movement of the feed carriage until it is closely approximate.

The machine is at present made in two sizes, one rolling threads up to 1 inch in diameter and the other threads up to 2 inches. The adjusting for different diameters with threads of the same pitch is made entirely by varying the setting of the stationary die by manipulating the hand wheels before mentioned. For other pitches a different set of dies may readily be substituted. Equipped with two sets of dies, as shown in Figs. 2 and 3, the machine can be used for rolling stud bolts, forming both ends at one operation.

Pacific Coast Business Conditions.

SAN FRANCISCO, Cal., December 9, 1905.—The present year will be closed before another communication from this city will have reached *The Iron Age*, and looking back we may see that it has been from every point of view the most prosperous year that San Francisco has ever experienced. Even now, coming to the close of the year, it is very hard in the building trade to find an unemployed man or to get additional hands. Plasterers and other workmen in the building line command $7 a day and of late the wages of tinners have gone up to the same figure. The amount of exports from the port of San Francisco for the year, including those to the Hawaiian Islands, will reach $54,000,000, while the imports are in proportion. The greater part of the increase in our export trade has gone to the Orient, Japan and China principally. As to Europe, the shortage of the grain crop of the Pacific Coast has made our sales in staples of wheat and barley very small, but this has been made up to some extent by the activity in other staples. Our exports of salmon and canned fruit to Europe have been exceptionally large. The production of merchantable lumber, oil and fruit has increased, so as to make up to some extent the falling off in the cereal product. And the activity in the settlements of the State during the year has given rise to an unusual demand for merchandise of all kinds. The trade of this coast with Alaska has gone up to nearly $11,000,000, of which San Francisco enjoys the least portion, most going to the Puget Sound cities.

In all this prosperity the iron and steel trades have participated to the full. As the year closes the reports of building operations in San Francisco show contracts approaching $21,000,000 and in Los Angeles $16,000,000, with a proportional amount in the other leading cities and towns of the State. The total value of building contracts in California for the year 1905 exceeds $70,000,000 and the sales of building hardware, structural iron and steel, &c., have been very large—at least 18 per cent. in excess of 1904. The operations in the lumber sections of the State have called for an unusually large amount of machinery and supplies for the redwood and sugar and white pine mills, as there has been a large increase in the production and in the establishment of new mills, &c. It requires from $50,000 to $100,000 to establish any kind of a saw mill plant and in some cases much larger sums are spent, the greater part of which is used in buying machinery of various kinds. It is the same in the oil industry and, although owing to various causes this did not show as great a gain as in former years, there was still an increase in production and in the purchase of supplies needed. There has been an increase in the amount of gold, silver and copper produced, and here again machinery has made up a large portion of the expenditure necessary in the preparation for the development of gold, silver and copper mines.

The mining interests of Alaska have shown during the year a great development. A company with a large capitalization is now being formed to work the tin deposits. In two or three years it is expected that great activity will be seen in tin mining in Alaska. It is the same with copper, as vast deposits have been found, especially in the region drained by the Copper River, where masses of 10 to 20 tons of native copper have been found. In many cases the assays of copper ore have yielded 50 per cent. of copper, with gold accompanying of the value of $20 per ton. This of itself will be a very good return, without taking into account the copper. As a matter of fact, in one of the most successful gold mines in Alaska the ore does not yield over $2 per ton. J. O. L.

The Thompson-Burger Gas Producer and Engine.

The Thompson automatic cut off gas engine and the Burger suction gas producer represent a type of power unit that is becoming popular in localities not favored with a supply of natural gas and where gas engines of a comparatively small horse-power are desired, although it is equally economical and efficient in larger units. The engine and producer were designed by L. F. Burger and are built by J. Thompson & Sons Mfg. Company, Beloit, Wis.

The engine shown in Fig. 1 has a rated capacity of 55 horse-power and the producer shown in Fig. 3 is designed to supply the engine with a proper amount of gas for this rating. The engine is of the two-cylinder, four-cycle, single acting tandem type, with automatic cut off. The cylinders are 13 inches in diameter by 17 inches stroke and are placed horizontally end to end. The two pistons are connected by one rod and are of the usual trunk type, of good length and a trifle longer than the stroke of the engine. The piston rod is secured to the piston in such a way as to be easily uncoupled and either piston may be removed without interfering with the other. The piston rod is taper fitted into the pistons and is held in position by a brass nut. The front piston is coupled to the connecting rod close to the outer end of the piston to prevent any rocking or tilting motion. The connecting rod is large and the crank pin box is bronze and of ample area to avoid undue heating. The boxes can be easily adjusted for wear by raising or lowering a wedge which is held in position by two screws, one above and one below the strap.

The application of the inertia governor to the engine is covered by patents owned by the company and comprises a small shaft fitted into the hub of the fly wheel, shown in Fig. 1, at A. On the outer end is fitted a small pinion which meshes into a segment which is attached to the governor. The governor weight C is pivoted at B and when the weight revolves with respect to the fly wheel the segment gear causes the small pinion to be revolved. On the inner end of the shaft is a quick acting screw thread which works in a brass nut, which is inserted in a sliding sleeve, D, shown in the plan. As the governor revolves shaft A, sleeve D, which is connected to a rocker shaft, E, is moved over toward the engine box. This shaft is provided with cranks, J, as shown in Figs. 1 and 2, connected by the rods K to sleeves on shaft F. These sleeves carry small bevel gears on the sides opposite the rods K. The gears G are keyed to the shaft F and the gears H are loose on the shaft. Each gear, H, has a cam on its hub which actuates the governing valve P, shown in Fig. 2. Gear L being held in position by the connector K is driven by gear G, which then drives gear H in the opposite direction. These gears are all set so as to open and close the governing valve P at the proper time. For example, when the engine is running at full load the governing valve will keep the port open during a complete suction stroke, thus allowing the piston to draw in a full charge; when the load is cut down to one-half the governor will at once respond to the load, thus moving the rock shaft and the bell cranks with it, since they are keyed to the shaft. As the cranks J move down they pull down the sleeves and gears L and thus partly rotate gears H, which change the time of opening the governing valves P and make them close at about one-half of the piston travel, thus allowing the cylinders only a half charge. There is no wire drawing of the charge so common to the throttling system of governing, as in this case the ports are either wide open or closed altogether. This valve operates very quickly, making a cut off almost as quickly as a Corliss engine.

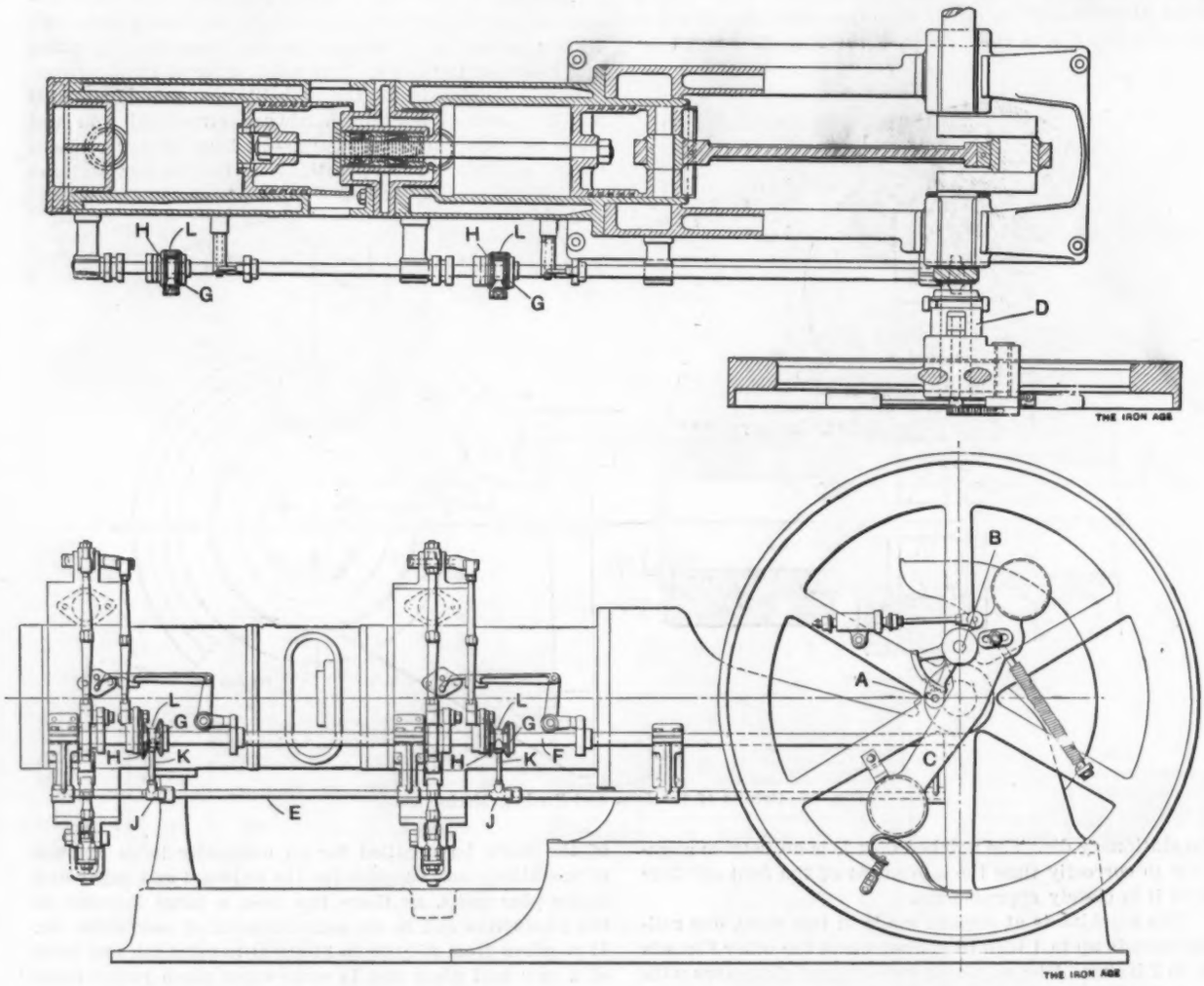


Fig. 1.—Plan Section and Elevation of a 55 Horse-Power Two-Cylinder Tandem Thompson Gas Engine.

The valves are of the vertical poppet type, of large area. The inlet valves are placed on top of each cylinder and the exhaust valves directly opposite, underneath each

cylinder, thus doing away with pockets and long ports. These valves are all actuated by a simple mechanism conveying the motion from the cam shaft in such a manner as to give a direct up and down movement to the valves, thereby avoiding side wear. The water jackets of each

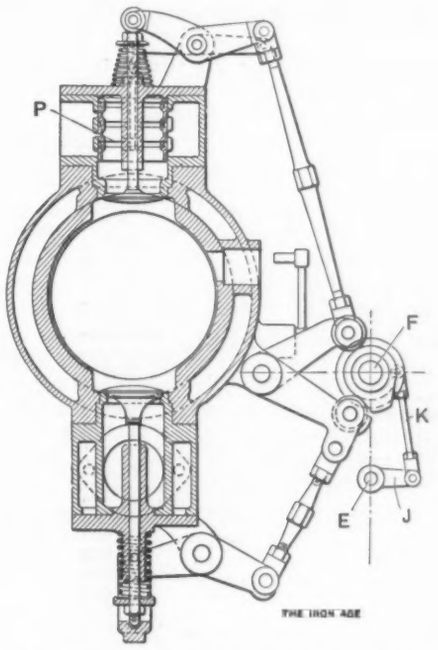


Fig. 2.—End Section, Showing the Valve Gear.

cylinder, valve chest and the intermediate head, which form also the piston rod packing chamber, are all separate and independent, doing away with all water packed joints, and the cooling of each cylinder can be regulated as desired. The piston rods are separately packed and are made of a special alloy guaranteed to withstand a temperature of 1400 degrees F. The packings are in three segments to allow for expansion and contraction and the sections are fitted into a conical cup and forced down and held in place by a compression spring. These cups are free to move in the cup chamber to allow for down wear or vibration of the piston and rod and insure a tight joint. They are ground and faced on the end so that they may rub or slide in any direction without leaking.

The electric igniters are of the hammer break type, inserted in the side of each cylinder and are easily accessible. The points are just inside of the combustion chamber, where there is no danger of fouling. The single throw crank shaft is 4¾ inches in diameter at the bearings and pin. The bearing on the pulley side is 12 inches long and the other bearing 10½ inches long. The crank pin is 5 inches long.

The bed is massive and designed on lines to secure a maximum amount of strength, the metal being distributed to equalize and best withstand the strains. The end of the bed is faced and bored to receive the cylinders, thus bringing all working parts into perfect alignment. The subbase is made with an extension to support the outer cylinder to allow plenty of room to get at the working parts of the engine.

The fly wheels are 66 inches in diameter and the rims are wide enough to receive a belt 6 inches wide. The combined weight of the two is 3700 pounds. The governor mechanism is fully protected within the rim of the governor fly wheel.

The cylinder and piston rod packings are oiled by a force feed pump and the main bearings and wrist pin are oiled from a reservoir placed on top of the crank shield and arranged with sight feeds adapted for continuous running. The starting device consists of two valves that are opened by a single lever; moving the lever one way opens

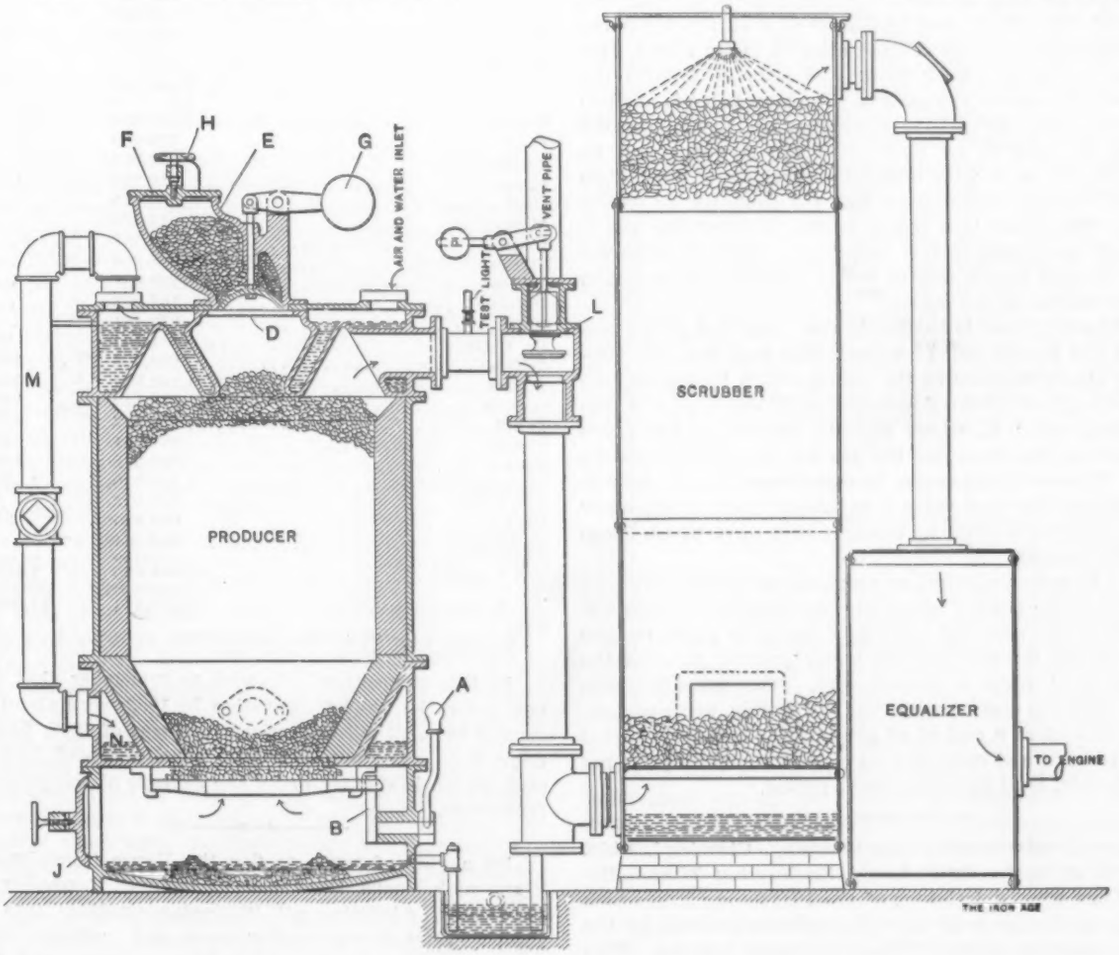


Fig. 3.—Section of the Burger Gas Producer with Its Scrubber and Equalizer.

one valve and reversing the operation the other valve is opened. When the engine is shut down the lever that opens the valve protruding into the cylinder is pushed down, the fly wheels continue to revolve from their momentum for several revolutions and cause the engine to act as a compressor storing compressed air in a tank. When the engine is to be started it is set so that the crank pin is about 10 or 15 degrees above the center. The igniter

is then set so that it is almost ready to trip. A small quantity of gasoline is poured into the valves and the valve toward the air tank is opened, which will permit sufficient air to rush past the gasoline, taking the vapor with it, thus making an explosive mixture which will be ignited just as soon as the cylinder is full and move the piston, at which time the igniter trips, igniting the charge.

The producer is of cast iron and steel construction and is provided with a scrubber and drying tank or equalizer. The producer proper embodies a charging hopper, shaking grate, evaporator and superheater and is furnished with fire brick linings throughout. The shaking grate is located about 1½ inches below the fire pot and is oscillated by the lever A, which is fastened to lever B. The door J in the ash box is planed smooth and scraped so that it can be closed tight to exclude air, being secured by the hand screw. The hopper contains a valve and an air tight cover through which the coal can be charged while the engine is running. The hopper valve D is located at the bottom of hopper E, in Fig. 3. The hopper cover F is ground to make an air tight joint, so that when the cover is taken off the hopper can be filled with coal without any danger of air being drawn into the producer, valve D being held closed by the weight G. After the hopper is filled with coal the cover is replaced and clamped down by screw H; then the valve D may be opened to allow the coal to fall down into the producer. The producer can thus be charged without allowing any air to get mixed with the gas to form an explosive mixture.

The producer is provided with a vent valve, L, for use when blowing up the fire preparatory to starting and when shutting down, and by the use of it all the gas in the scrubber will be saved and not allowed to get mixed with air, thus avoiding back firing and interfering with the proper operation of the system. The vent valve L has two ground seats. By raising it against the upper seat the gas is allowed to go down into the scrubber and up through the coke with which the scrubber is filled, then out at the upper side, down into the equalizer or drying tank. The latter is a hollow vessel in which the gas is allowed to remain a few minutes to separate moisture from it, and also serves to dampen the pulsating action of the suction of the engine.

The evaporator is located in the upper end of the producer and is kept full of water. The heat from the producer slowly evaporates the water, which by the suction of the engine is drawn down with air through pipe M into the evaporator N, where the air and steam are again heated and then pass into the ash box and up through the fire. Whenever the engine is shut down the ash door is opened and the vent valve L is pushed down on its lower seat, allowing a draft up through vent pipe, which keeps the fire burning.

All pipe connections are provided with hand holes, so that they are readily accessible for cleaning. Large water traps are provided with each producer plant to take care of the drainage of the water passing through the system and form a perfect seal. The manufacturers claim that the cost of operating this engine, using anthracite pea coal at a cost of $5 per ton, is $1.38 for a period of ten hours, and operating on coke at the same price per ton the cost is $1.72 for the same period.

The Cleveland-Cliffs Iron Company, Cleveland, Ohio, ordered from the Great Lakes Engineering Works, Detroit, last week a freighter of the 10,000-ton class, which will be a duplicate of the two steamers ordered by the same company recently from the same builder. This makes seven 10,000-ton boats which the Great Lakes Engineering Works now has under contract, and the order emphasizes the rapid drift of iron mining companies toward ownership of their own lake fleets.

The Chicago automobile show will be held at the Coliseum and the First Regiment Armory, Chicago, February 3 to 10, inclusive. Demands for space have at this early date outgrown the available combined floor area of these two buildings, and it is possible that next year the show will be held in the new horse pavilion at the Stock Yards, which has a floor space of nearly 200,000 square feet. About 250 manufacturers of automobiles and supplies will be represented at the coming show.

Oliver Iron Mining Company's Ore Shipments.

Shipments of 1905 for the Oliver Iron Mining Company (United States Steel Corporation), as compared with 1904, are as follows, by mines:

Mine.	Gross tons. 1905.	1904.
Aragon	423,261	374,944
Chapin	902,628	541,324
Columbia	27,883	.....
Mansfield	38,584	79,173
Michigan	58,233	.....
Riverton	82,611	81,543
Iron Ridge	37,233	.....
Totals	1,570,433	1,076,984
Bessie	21,879	.....
Hartford	322,364	179,980
Lake Superior	729,192	590,339
Queen	253,376	311,479
Volunteer	106,281	71,870
Champion	64,680	174
Totals	1,497,772	1,153,842
Atlantic	208,039	77,224
Aurora	541,223	212,920
Norrie	987,590	618,638
Tilden	192,203	204,581
Totals	1,929,055	1,113,363
Chandler	365,739	422,162
Pioneer	653,682	505,432
Savoy	342,995	74,866
Soudan	205,002	70,713
Zenith	109,818	86,557
Totals	1,677,236	1,159,730
Burt*	1,861,680	1,415,884
Clark	358,869	256,873
Chisholm	232,733	130,732
Glen	289,559	280,412
Hull	233,775	.....
Monroe	13,730	.....
Tener	58,136	.....
Morris	1,071,316	.....
Myers	188,627	.....
Pillsbury	162,058	.....
Rust	272,451	.....
St. Clair	61,792	26,748
Sellers	262,205	207,990
Adams	1,140,984	940,105
Duluth	142,172	149,819
Fayal	1,358,922	975,102
Genoa	281,081	244,150
Spruce	606,295	589,319
Mountain Iron	2,500,570	1,168,855
Virginia†	402,224	5,395
Higgins	239,435	35,286
Stephens	366,264	.....
Totals	12,104,878	7,426,670
Totals all mines	18,779,374	11,930,589

* Includes for 1904: Rust, Hull, Burt.
† Includes for 1904: Oliver, Ohio.

In this connection it is well to remember that shipments for the Steel Corporation in 1902 were about 16,000,000 tons. The corporation's business of 1905, figuring on a total of about 34,000,000 tons, is about 55.3 per cent., which is slightly under the average of the preceding four years.

By a vote of seven to five the House Committee on Ways and Means December 19 reported favorably the Payne bill admitting all Philippine products into the United States free excepting sugar and tobacco, which are to pay 25 per cent. of the Dingley rates until 1909, when they also are to go on the free list.

It is stated that the housesmiths' strike in this city has been practically won by the employers. Information coming from the employment bureau of the Allied Iron Trades says that 600 applications have been made for jobs on the Post & McCord contracts. Less than 400 men struck. Of the contracts of Post & McCord the greater number are manned with new men, and at the others preparations are being made for work.

Tendencies in the Foundry Industry.*

BY DR. RICHARD MOLDENKE, WATCHUNG, N. J.

Apart from the revolution in the foundry from old time customs there is manifest to-day a tendency toward refinement in method little dreamed of by the most ardent iconoclasts of a decade ago. Perhaps our peculiar situation in this country, where the foundry is engaged in pushing specialties to the limit, has enabled us to take the lead in many directions. On the other hand, we must deplore the lack of interest in—or, shall we say, lack of time for?—many things which, if properly followed up, would remedy many a difficulty with our cost accounts. For instance, while the adaptation of the molding machine for production in quantity is sometimes truly marvelous, how little is known of it outside of the shops where this development has taken place. Again, how little is done by the producers of coke and pig iron to bring the ordinary classes of these materials up to the standard of what we now term "fancy" articles.

The importance of a thorough knowledge of the materials entering the foundry is becoming more manifest daily. I remember distinctly the adverse criticism a book on cast iron came in for at the time of its publication because it went into the production of coke and pig iron too extensively. To-day we see that it is good to know how these processes are carried out, as we can more easily trace the causes of loss and difficulty in the foundry—conditions not realized by the makers of these materials, as they are not using them daily in the difficult art of making castings of the highest quality for the lowest price. I might go further and say that the founder who is also thoroughly versed in the art of casting brass and bronze is more apt to be particular with the iron end of his concern and can overcome occasional metallurgical puzzles more easily.

The Tendency Toward Multiple Operations.

Perhaps the very first thing which strikes the European foundryman who is visiting our plants is the great stress laid upon system and organization in our strictly modern establishments. The European founder, with his more varied work of smaller aggregate tonnage, casts his pieces one by one and finishes each with the assembling following directly. We, with an eye to the finer economies, prefer to put through an order of anywhere from a dozen to thousands of pieces of a kind, finishing them up for stock and stealing the parts required for sales and promises. As the stock in the warehouse gets below a certain minmum another shop order goes in to fill up the gap. As a consequence the work is always produced at the cheapest rates possible. I have personally known single orders of 100,000 castings of some 30 pounds eeach given with simply a blue print of the casting attached to the document. Many times the quantity has been 30,000 to 60,000, which meant that economical work could be done here if anywhere. Actually the figures at which these castings were carried out would be astonishing.

Apart from the use of molding machines to turn out these classes of castings cheaply there is a noticeable tendency to economize shop room, and hence molds are piled as high as they can be conveniently poured. It may be objected that this method oftentimes produces more sprues per pound of casting than the old way and that if trouble comes a stack of molds will be ruined instead of only a single one. Yet this system has been found to pay wherever tried and the getting of more tonnage for a given floor space is bound to spread. The idea, however, should be followed out to its logical end wherever work is made in sufficient quantity. This would seem to be the stacking up of the molds in fairly deep foundry pits, the iron being brought in large ladles by traveling crane and poured from the bottom of the ladle. Suitable variations in the method can naturally be devised for given cases, but the idea remains the same—to get the greatest tonnage for a given floor space in order to save investment and cost of output.

Sand Treatment Important.

Greater attention will ultimately be given the preparation of the molding sand. European shops are far ahead of us in this respect, every foundry of importance grinding its sand to a given standard, then passing it through mixers, which incidentally fill the perfectly uniform material with a maximum of air, thus cushioning the sand and keeping it open. When a highly refractory molding sand is used this treatment assists in turning out the smoothest kind of work. As our consumers are constantly harping on better looking work this point might be considered more carefully by American foundrymen. Many sands are exceedingly uniform in their natural state, as for instance the well-known Albany, the result being highly finished castings where the best molding methods are employed. On the other hand, who does not recognize a Pittsburgh casting—that is, one made in the sand dug in the environs of the Smoky City? Judicious sand treatment would go a great way to remedy the difficulty even there did they make the class of work current in the Eastern States. What great differences may exist in molding sand in the same heap may be seen in an exaggerated way where sand conveyors are in use. Here, unless special precautions are taken, the loamy particles in the sand may get together, leaving the silicious portions without a binder. The result is that copes drop out, scabs are formed and other troubles come. No wonder that in the ordinary tempering of sand an art is involved which must be acquired before a man can rate himself proficient in this branch of the work. Hence the effort to get away from imperfections in the make-up of the molding sand heaps by mechanical grinding and mixing. This has not struck our country very hard yet.

Attention may be called here to the marked disposition of manufacturers of foundry facings and other supplies of a like order to learn more of their own art. The foundry industry as a whole is bound to benefit by this and we wish the facing men all success.

We must not forget to mention the growing practice of performing as many operations about the foundry as possible by mechanical means. We have now some excellent examples of what may be done in this way in our advanced foundries. Whether it be the mechanical charging of the cupola, the mold and sand conveyors, metal distribution, compressed air attachments or yard cranes this movement is to be encouraged, as wherever the manual labor of several men can be replaced by the brains of only one conditions of management are much easier to meet. The investment may become higher, but competition can be better faced and the resources of the nation employed to the greatest advantage.

Standardizing Demanded.

There is a growing demand for foundry standards. Thus flasks, pattern work and the molding methods depending upon the close co-operation of the pattern shop with the molding floor are coming in for considerable attention. The makers of molding machines will be greatly benefited by this desired standardization of flasks, for the time has now gone by when a manufacturer would go out of his way to get the most impossible screw thread in order that the repairs subsequently necessary would have to come to him. We shall undoubtedly see the day when all the designs of the drafting office of an industrial establishment will go for revision to its foundry superintendent in order to standardize the nonessential elements therein and create less labor in producing the castings.

In going through many a foundry where very large loam molds are made for stock work one cannot help regretting the tearing down of much of the mold which might be left standing if the subject of permanent molds had been studied more carefully by the foundry foreman. The effort to-day is to economize in every way possible and very often here is a chance to begin.

We owe much to our high class custom pattern shops for the progress they have forced upon the pattern end of our industry. It is not so long ago that metal patterns were unheard of in many foundries. It seemed like a waste of good money to put more time and effort on a pattern than was required by the ordinary article we all

* A paper read before the New England Foundrymen's Association, Boston, Mass., December 13, 1905.

have piled on our pattern shelves. However, many a shop to-day can boast of a set of metal cutting machines which remind one of a first-class tool room. This tendency is, however, closely interwoven with the specialization of the foundry, and where a first-class man is in charge the pattern storage soon becomes less of a graveyard for obsolete material.

We can also note a marked tendency toward more substantial buildings. Wood is becoming dearer. Fires are more disastrous to the business than to the shop itself. Hence greater precautions to prevent shutting down when least able to stand it. Whether foundrymen are becoming richer or are more progressive is hard to say, but the number of new buildings going up to replace worn out and tumble down shacks is very gratifying.

Greater Use of Steel Scrap.

Turning now to the melting and the closely allied laboratory we see that the most strongly marked feature is the production of higher grade castings by the addition of steel scrap—or, in other words, the reduction of the total carbon in cast iron, making the crystalline structure more closely adherent and hence the whole casting stronger. Here the skill of the melter is joined with that of the chemist so that value is received from the higher priced stock charged into the cupola. The cupola process is being studied more carefully and experts in that line can produce results close to those of the air furnace or open hearth. Considering that this is accomplished with fuel and metal in contact and by a notoriously unsatisfactory melting method, which the cupola process undoubtedly is from the standpoint of the treatment the metal gets in it, the foundry industry is to be congratulated upon its ability to retain a strong hold on the making of castings in the face of the hard knocks it is getting from the steel casting establishments. This movement toward better grades of metal is but in its infancy. The cupola, which is a cheap melter, will undoubtedly be improved with the view of getting better results from the steel scrap additions. The metal will be safeguarded more from burning and the additions of the scrap will be systematized more, so that a given quantity will produce given results more regularly than is now the case.

The tendency above mentioned has somewhat retarded the introduction of air furnaces in general foundry practice. However, taking into consideration the demand for better irons, better coke, better melting methods, the specialist founder will soon tire of buying high class material and spoiling it or taking big chances in that direction. He will naturally revert to the air furnace as better able to give high class results from high class material and the consumer will be glad to pay the difference.

Conservative Prices for Castings.

Those who have taken the trouble to follow the silver and copper market will have noted that the high levels reached are not due to spasmodic fluctuation made by financial manipulation but are the result of a real ability on the part of the civilized world to absorb these metals. We have the same thing in the iron market. The swing of the pendulum from the 22,000,000-ton mark will soon carry the consumption of the metal far into the thirty or forty millions, and unless the country can produce this quantity steadily the price is bound to rise sharply. To-day we find few men in our line of work who are out for abnormally high prices for their product. We all wish for nothing better than a fair profit on base purchase prices, which are fair to the furnace and coke dealer as well as to us. Hence the output of our establishments will be kept as much as possible within conservative price limits and the quantity will be made to increase gradually. It may be said, however, that the resources of the country will not be able to respond quite as fast as the demands the rapidly increasing population is making upon them, and hence we will never see the days of 1894 prices again, for which let us be thankful. All this means that with better prices, even if pig iron and coke hold well up, a more liberal tendency in the way of investment is bound to manifest itself and everybody will be the gainer.

Whereas once the melting point of the various cast irons formed the one absorbing topic for articles and discussion at present it is the elimination of sulphur in the cupola. This is a good sign, and even if one man finds that he cannot get the results of the other, and therefore we are at present quite at sea regarding a desirable method, yet it shows a tendency and a good one.

With more light on this question it is but a step to work on others and finally we may get down to a closer study of the burning effects manifested in cupola and air furnace practice, which I hold are the most important by far of all the phenomena of the foundry melting processes, granted that the chemical composition is otherwise correct.

The Use of Ferro Alloys.

This leads us to the use of the ferro alloys in the foundry to correct the evils we know and others we have a vague apprehension of. To-day the use of ferromanganese and of aluminum is quite extended and is really a help in many instances. With the poor pig iron and especially the very poor coke the smaller founder is forced to put up with, the use of either of the above mentioned correctives is to be recommended. Unfortunately ferromanganese is hardly powerful enough to do much good in the foundry unless the mixture has a goodly proportion of steel in it. When this is the case it means a higher melting point, and with higher temperatures than ordinary cast iron is apt to be poured at much of the oxidation is removed and we avoid the pin holes and other weakening and unsightly effects which seem to be somewhat the rule at the present day. The real foundry alloy, however, is still to be discovered and made commercially and its day cannot come too soon.

I look forward to great improvements in the making of producer gas. We hear of mysterious developments across the water by which a more powerful heating agent is secured. How far the reports are true we cannot say, but that work is being done in that direction is certain. It may mean a cheaper and more powerful fuel gas, and if so it has a good place in the modern foundry, for whoever has worked with gas instead of coal will stick to the former until the price soars out of sight. Whether we are to have the open hearth furnace in the big foundries or the making of electricity with the gas engine in the smaller foundries for use in melting time will determine; but it is well to keep this development before us and to profit thereby.

The Electric Furnace for the Foundry.

This brings us to the consideration of another matter. The Canadian Government is doing much to foster the development of electric smelting. The makers of the latest types of electric furnaces are constantly getting better efficiencies. Now with a cheap gas in a gas engine and for the making of very small castings in small quantity there is no reason why the small steel and bronze foundries should not melt their stock in the electric furnace. The higher price of the work sold will probably stand this. This matter will bear watching. I have recently noticed the suggestion of Dr. Waldo of New York for the making of Bessemer steel rings or suitably shaped small ingots, these to be of the composition of the steel casting. Now by charging these small ingots into the electric furnace one obtains a fluid steel of the proper composition to cast. I would suggest as an improvement that the ingots be preheated up to the highest point possible without injury to the metal—say, just as the ingots for rails or structural steel are treated. This would leave for the more expensive electric current only the finishing heat necessary to melt and superheat to the point right for pouring.

The considerations presented above will show our foundrymen that we are by no means through with the improvement of our processes, and were it possible to enlist an active encouragment on the part of the industry many of these very direct problems could be attacked and possibly solved.

The Direct Metal Process.

Finally we come to the general problems of the foundry, in which there are also marked signs of a change. This will probably affect only the very large industries for the present and next generation, but what may come

after is hard to say. Foremost stands the rapidly increasing use of direct metal. This is more marked across the water, but is bound to come here also. The big segments for the tunnel shields and linings should never have been made of remelted metal. However, this does not mean that it was advisable from the first to jump into a new method for such vast contracts. Here again we strike the importance of the use of steel scrap in gray iron castings in order to reduce the total carbon. I would not advocate the use of direct metal just as it is, but to have the stream of metal from the blast furnace go into large heated mixers, which means greater—in fact, more easily attained—uniformity than is ever possible with the cupola. Now into this mixer there should be charged successively quantities of steel scrap which has been heated up almost to melting. This accomplishes a twofold purpose. First, it gives a reduction of total carbon without lowering the temperature of the metal in the mixer too seriously to be corrected at once by the heating method used as well as the comparatively large quantity of metal that should be in the mixer all the time. Now, the first result is the making of a high grade cast iron. This iron should be good enough for all the purposes the process could be used for, such as the making of pipe, tunnel segments, ingot molds, &c.

The second effect of the addition of the preheated steel scrap is that the problem of kish is done away with. This is the bugbear of the direct metal foundry, and in fact has retarded the introduction of direct metal for important work so much that at one time it was thought out of the question to think of ever going back to this ancient way of making castings.

What, then, will be the result of this tendency? It means that blast furnaces will be located wherever the raw materials not only are favorable but where there is a good shipping point for pipe, possibly car wheels and not impossibly malleable castings for car work. The furnace proposition will then become one of allied industries to give an outlet for the pig iron made which will fit these uses, and all the pig iron not of composition to go into the various mixers will be put upon the market.

While this seems visionary, it is nevertheless a fact that one very large combination is about to break ground for just such an establishment and we may hear from direct metal pipe very soon. With our American enterprise one hesitates to say just where these changes in method of production as well as administration will end, and it is even within the range of possibilities to find stoves made at a blast furnace once the molding machine has conquered the field that is before it in that line.

It remains for the men at the very top of our great industrial establishments to solve the fine points in producing enormous quantities of high grade castings and to make them cheaply. These men are to be found in our foundrymen's associations, in our great engineering societies and wherever the active individuals of our industry get together to discuss questions of practice. I venture to say that without our progressive institutions of this kind the entire foundry industry would be what it still is in some of our large cities where the pig iron salesman makes the mixture and the ignorance of the customer makes the price.

Michigan Copper Mining Notes.

Important negotiations have just been closed in Michigan copper lands. By them an organization of leading copper men from other parts of the country aquires idle properties on the end of Keewenaw Point, Lake Superior. The Keewenaw Copper Company is a consolidation of the old Keewenaw, Mandan, Medora, Aetna, Philadelphia & Boston, Girard and Vulcan, all developments of more or less prominence in the early days of Lake Superior exploration, when the attention of the copper developing syndicates was directed to the end of the point and before the richer finds near Houghton, in the amygdaloid, and at Calumet, in the Calumet conglomerate, drew all attention that way. Since then, more than a generation, these properties have been neglected. A little over a year ago C. A. Wright, Hancock, Mich., grouped these old properties, in connection with similar work he was doing on other lands, which latter resulted in getting the Calumet & Hecla Company to take immense tracts on the end of the point, which it is now developing. He organized the Keewenaw Copper Company with $10,000,000 capital, in $25 shares, and 150,000 shares were issued as follows: To the Boston underwriters, 60,000; for public sale, 60,000; Lac la Belle railroad purchase, 15,000; promotion and other fees, 15,000. The public took only about 12,000 shares and the underwriter were obliged to take and pay for the 108,000 shares remaining out of the public and their own portions. They had taken up all but 43,200 shares of these when Thomas F. Cole and associates were approached and agreed to become interested provided that they could have the majority. The 43,200 shares were turned over to them at the underwriting price of $5.50 per share, a further issue of 50,000 shares was made out of the capital stock which Mr. Cole and party took a few days ago at $10, and 7000 shares more were made up from the underwriting holdings to give them a bare majority. The company now has, therefore, 200,000 issued shares of a par of $25 and called up to $5.50 and $10 per share.

Associated with Mr. Cole in this enterprise are John D. Ryan of the Amalgamated Copper Company and some friends represented by him; some of the United States Steel Corporation officials always associated with Mr. Cole in Arizona and Montana copper, comprising D. G. Kerr, D. M. Clemson, James Gayley and possibly others, and Messrs. Hoatson and Collins of the lake, both relatives of Mr. Cole, and connected with him in the other enterprises mentioned. Included in the deal are the 1120 acres of land of the Resolute Copper Company, which were under option to Mr. Collins and which lie close to the Keewenaw properties. For these $200,000 is understood to have been paid out of the Cole funds in Keewenaw. Resolute has done some work, having an old shaft nearly 400 feet deep with 2000 feet of drifting. At present five diamond drills are working on the lands of the consolidated company and it is proposed to develop largely as soon as possible. The Keewenaw Copper Company owns the Lac La Belle Railroad, which is under construction along the easterly part of Keewenaw point to a good harbor at Lac La Belle and which will open the various mining locations on the outer end of Keewenaw point. The district has suffered from lack of railroad facilities, but now it is to have not alone the Lac la Belle Railroad but a branch of the Mineral range which is owned by the Canadian Pacific.

If the developments of this company and the Calumet & Hecla, in the same part of the Michigan copper belt, are successful they will open a new and very large area of copper mineral lands on the lake which cannot fail to have a most important bearing on the future of the district.

The Rudolph Land Company has been organized at Duluth with small capital but with a considerable sum paid in above the capitalization to explore in a determined way for copper on the westerly end of the Keewenaw formation. The company is a combination of the Minong Copper Company in which Duluth men are interested and of the Weyerhaeueser Pine Syndicate, which has a large acreage in that section and which controls about two-thirds of the stock of the new company. The company is named for Rudolph Weyerhaeueser, a son of the prominent lumberman of that name. Some work was done three years ago on the Minong property by John W. Gates and associates and a shaft 84 feet deep was sunk exposing a bedded lode carrying stamp copper to some extent. Considerable machinery, including compressor, drills and a hoist, is on the ground. Large tracts of land along the Minong range have been bought by Messrs. Longyear and Ayers, well known in the iron and copper regions as men of capital and skill. D. E. W.

Fritz W. Luermann, consulting engineer of Berlin, Germany, has been appointed engineer to design the new basic Bessemer and open hearth steel plant to be built by the Société Anonyme Metallurgique d'Esperance-Longdoz, at Liége, Belgium.

The Cookson Steam Trap.

High operating efficiency and a construction which insures durable and continued service with little attention are features claimed for the Cookson steam trap, which the D. T. Williams Valve Company, Cincinnati, Ohio, has recently put on the market. The exterior view given in

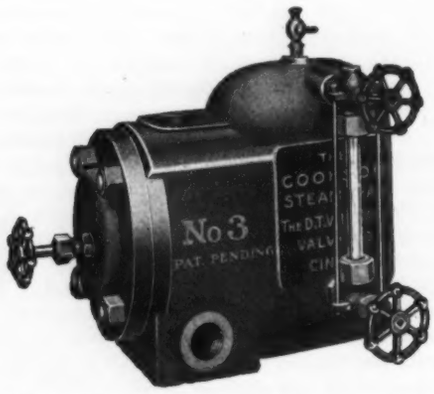


Fig. 1.—General View of Cookson Steam Trap.

Fig. 1 shows the location of the inlet and outlet, the gauge glass, the regulating device and the air cock. The sectional view presented in Fig. 2 shows the trap, made with a heavy body of cast iron and with two chambers, one the receiving chamber and the other the discharge chamber. The cover is arranged with a deflecting hood to protect the valve against the entrance of dirt and grit. The entire valve mechanism is of brass construction and is operated by a seamless copper float designed to withstand a

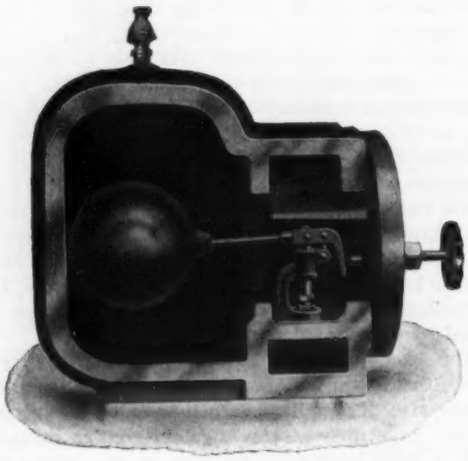


Fig. 2.—Sectional View of Cookson Trap.

constant working pressure of 200 pounds. The trap has the advantage that all parts are interchangeable and it can be taken apart without breaking the pipe connections. The removal of the cover exposes the valve and its seat in their working position. The trap is made in six different sizes with connections varying from ½ inch to 2 inches and rated to take care of the water returned from 600 feet of radiation up to 6000 feet of radiation.

The Talbot Process in England.—Announcement was made at the recent annual meeeting of the South Durham Steel & Iron Company, Limited, held at Newcastle-on-Tyne, England, that the Talbot or continuous process of steel making would be installed at the company's Malleable works, Stockton, and at its West Hartlepool works. Both plants will be completed in the near future. An allied company, the Cargo Fleet Iron Company, Limited, has had Talbot furnaces in operation for some time at Middlesbrough. This plant is working on metal made from Cleveland iron ores and the results have been quite satisfactory in the production of steel rolled into plates. The South Durham Steel & Iron Company is the largest producer of plates in Great Britain and it has now acquired control of the Talbot Company. On the East Coast, England, plates have been made heretofore from hematite iron and this has meant the importation of Spanish ores. The change that will soon be made from Spanish ores to Cleveland ores with the employment of the Talbot process is a matter of considerable importance to that district.

Important Customs Cases Appealed.

WASHINGTON, D. C., December 10, 1905.—The Treasury Department has directed the Collector at New York to take an appeal from the recent decision of the Board of General Appraisers involving the dutiable classification of certain cold rolled steel strips. In a letter to the Collector Assistant Secretary Reynolds says:

> The Department is in receipt of a decision of the Board of United States General Appraisers, G. A. 6213 (T. D. 26,870), of November 20, 1905, wherein it is held that certain strips imported by the Crucible Steel Company and similar to those heretofore passed upon in United States vs. Crucible Steel Company (137 Fed. Rep., 384; T. D. 26,157), are not subject to the additional duty of 1 cent per pound for steel, cold rolled and brightened, within the meaning of paragraph 141 of the tariff act of July 24, 1897.
>
> After a careful consideration of the case, its importance and the issues involved, the Department has decided to take an appeal and you are hereby directed to file an application for review of said decision, in accordance with the provisions of section 15 of the act of June 10, 1890.

The Department has also decided to appeal from the board's decision with regard to the classification of hematite ore or red oxide of iron, which was classified for duty as a pigment or color at the rate of 30 per cent. ad valorem under paragraph 58 of the Dingley act, but held to be dutiable as iron ore at the rate of 40 cents per ton, following the court decision of the case of Francklyn & Ferguson vs. United States (119 Fed. Rep. 470). The Department contends that this particular kind of ore is imported exclusively as a pigment and is therefore dutiable at a much higher rate than ore intended for the production of iron.

The Department now has before it the record in the case decided by the board December 9, involving the classification of chromium, molybdenum, tungsten and other ferro alloys, which were held by the board to be dutiable at $4 per ton by similitude to ferromanganese. The Department has contemplated bringing another test case in the hope of securing a decision under which a higher rate of duty could be levied on these products, and if the record in the case just decided is found to meet all requirements an appeal will probably be directed. W. L. C.

Recent Customs Decisions.

Old Iron Chains.

After the taking of considerable testimony the Board of United States General Appraisers December 15 rendered a decision in the protest case of G. W. Sheldon & Co., New York, regarding the customs classification of old and worn out iron chains. The Treasury Department officials took the view that the articles were properly dutiable under the provision for scrap iron, with duty at the rate of $4 per ton. This return was challenged by the importers on the ground that the merchandise should be deemed old junk and as such be admitted free of duty. At the time of the hearing before the board the following stipulation was made: "It is conceded by the importers that the merchandise, the subject of this protest, was old iron chains, that they were in small pieces, that they could not be sold again for use as chains, that they were fit only for remanufacture and were designed to be and were in fact remanufactured." The importers relied in support of their contention on the commercial understanding of the word "junk" and on the construction of paragraph 122 of the tariff law. It was brought out by the testimony of several witnesses that the terms "scrap iron" and "junk" are interchangeably used. In a decision written for the customs court by I. F. Fischer the claim of the importers is overruled and the collector's assessment affirmed. Mr. Fischer says in part: "On the question of which term is the more specific designation for the merchandise we say without hesitation that scrap

iron is, particularly in view of the express language of paragraph 122, to wit: 'Wrought and cast scrap iron and scrap steel, $4 per ton; but nothing shall be deemed scrap iron or scrap steel except waste or refuse iron or steel fit only to be remanufactured.' In view of the explicit language of paragraph 122 and in the light of the decisions cited we are of the opinion that the claim of the importers is utterly untenable."

Judgments in Various Suits.

The Board of Appraisers has rendered judgment in a number of suits brought by importers of metals to test the correctness of classifications returned by collectors and other officers of the customs. Claims filed by the following were overruled: Campbell, Metzger & Jacobson, brass watch fobs; Carlowitz & Co., Japanese gongs; Reiling, David & Schoen, machinery not castings; Guthman, Solomons & Co., furnished needle cases. Protests sustained included Leon Willard & Co., steel buckles; Thomas Irwin & Sons, steel pens, and George Borgfeldt & Co., electroliers.

The Electric Age at Niagara.

On the Niagara frontier the age of steam is passing and the electric age is being speedily ushered in. Niagara Falls power is being radiated in many directions from the falls for use in manufacturing and for transportation to Buffalo, Lockport, Rochester, Toronto and Syracuse and to operate a network of electric traction systems in western and central New York. The Niagara Falls Company is producing at two power houses on the American and one power house on the Canadian side 155,000 horse-power, of which 90,000 horse-power is being distributed and used. The Niagara Falls Hydraulic Power & Mfg. Company is producing 50,000 horse-power, and is now engaged in greatly enlarging its plant, and the Ontario Power Company is about ready to generate and deliver 42,000 horse-power of its ultimate capacity of 250,000 horse-power.

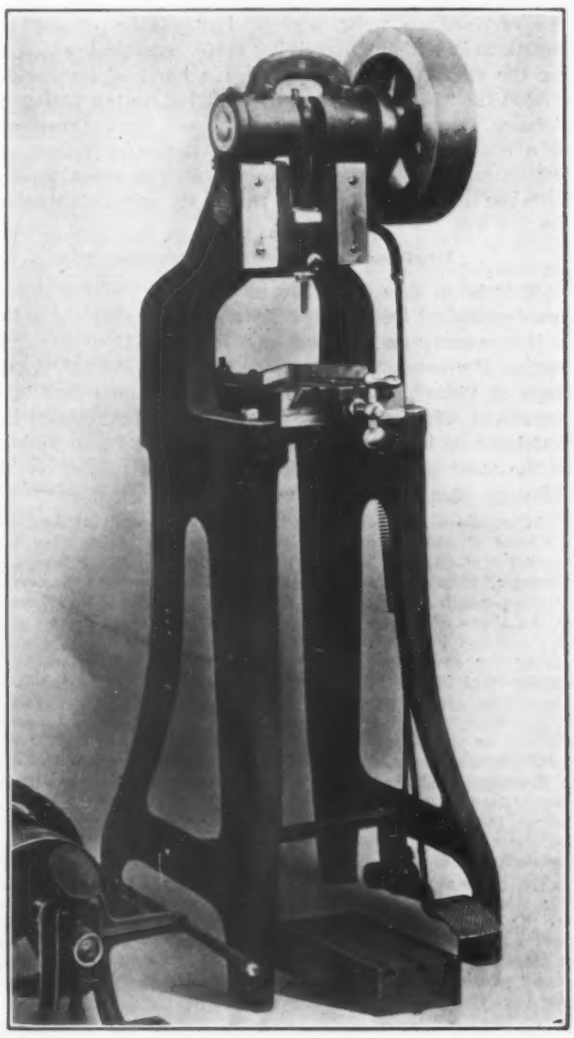
The Niagara, Lockport & Ontario Power Company, which acts as a distributer for the Ontario Power Company, has contracted with the New York Central Railroad Company to supply power for the operation of its subsidiary traction lines throughout the State, and elaborate plans for the transmission of the enormous quantities of power to the central portion of the State for this purpose are being carried forward with the utmost dispatch, the contract calling for delivery of Niagara power at Syracuse by March 1. Work on the transmission line, which will be of aluminum cable strung on steel towers to carry a current of 60,000 volts, is being pushed to completion by that date. The right of way which the company owns is 300 feet wide from Niagara Falls to Lockport, 200 feet wide from Lockport to Rochester and 100 feet wide from Rochester to Syracuse, this right of way being adequate for six pole lines of the size of the one now building. At Lockport a right of way 100 feet wide branches to the Lackawanna Steel Works at Buffalo.

The transmission line to Toronto is rapidly approaching completion and power will soon be delivered to that city for the operation of its traction lines..

The enlargement and extension of the canal of the Niagara Falls Hydraulic, Power & Mfg. Company is nearing completion, and it is expected that during the present week the barrier of rock separating the old canal from the new will be blown away and one of the most difficult phases of the work will have been accomplished. The water, however, will not be permitted to pass through the head gates until next season owing to the unfinished condition of the work beyond that point. The head gates are 30 feet high and will regulate the flow of water from the canal to the fore-bay on the cliff above the new power house, which is to be constructed on the bank of the river 200 feet beneath. The face of the cliff will be blasted away to provide a site for this power house, which will be the largest on the American side of the river, having a capacity of 120,000 horse-power. It is located about 1000 feet down the river from the present power house of the Hydraulic Company below the falls. The canal now about completed has been in course of construction for the past two years and it will probably require two additional years to complete the fore-bay, penstock, power house and other improvements which the Hydraulic Power Company has under contemplation.

The Barnes Keyseating Machine.

A machine for cutting keyways of from ⅛ to ⅜ inch wide in light work, manufactured by the B. F. Barnes Company, Rockford, Ill., is illustrated herewith. It was originally designed for use in the company's machine shop and proved so satisfactory that it was decided to manufacture the machine for the trade. The tool operates after the manner of a punch and does the work within its capacity accurately and rapidly. It is furnished with or without the pedestal. In the bench style its overall hight is 28 inches, and mounted on the pedestal it stands 63½ inches high. The sliding table has a longitudinal movement of 2½ inches, operated by a ball handle and screw. It is furnished with or without the chuck for holding the work. The table surface is 5¾ x 11¾ inches and contains three ½-inch T-slots. The subtable is 6½ x 11⅛ inches and has three ½-inch T-slots and a V-block. The floor space required by the machine is inconsiderable, the pedestal style occupying only 21 x 24 inches.



A Keyseating Machine Made by the B. F. Barnes Company, Rockford, Ill.

The losses to the Great Lakes fleet in the past season were the greatest ever known in one year. Seventy-nine vessels were lost by storms and fire, and the value of property so destroyed is put at $4,625,000. Cargo losses were $750,000. Some of the underwriting companies will be called on to pay out $2 for every $1 received in premiums this year. The property loss by the unprecedented storm of November 28 is put at $1,750,000.

The Toothless Cold Saw.

BY E. D. SEWALL.

Under date of February 3, 1823, Rev. Herman Daggett of Cornwall, Conn., wrote a letter to Prof. Benjamin Silliman of Yale College telling of the experience of a local cabinetmaker named Barnes in connection with repairing a cross cut saw of a very hard plate. He had heard that the Shakers sometimes used a "buzz" to cut iron. He therefore made a circular plate of a piece of soft sheet iron stove pipe, fixed an axis to it and put it in his lathe, which gave a very powerful rotary motion. While in motion he applied to it a common file to make it perfectly round and smooth, but the file was cut in two by it, while it received itself no impression. He then applied a piece of rock crystal, which had the desired effect. He then brought under it the saw plate, which in a few minutes was neatly and completely cut through longitudinally. When he stopped the disk he found it had received no wear and he immediately applied his fingers to it without perceiving much sensible heat. During the operation there appeared a band of intense fire around the "buzz," continually emitting sparks with great violence. He afterward marked the saw for the teeth and in a short time cut them out by the same means. It seemed to him that the disk never came in actual contact with the plate. Mr. Daggett raised the question whether the fire was the electric fluid.

Professor Silliman's Comments.

This letter was published in volume VI of the *American Journal of Science and Arts* and attracted attention in this country and abroad. In volume VII of the same journal Professor Silliman notes that he saw Prof. Robert Hare of Philadelphia execute with a common foot lathe operations similar to those described by Mr. Daggett and that later he had seen repeatedly the experiment succeed in the most perfect manner at the arms factory of Eli Whitney. Among other things he said:

> When pieces of the best and hardest steel, such as files, and the steel of which the parts of gun locks are made, were held against the edge of a revolving soft iron plate, 6 inches in diameter, they were immediately cut by it with a degree of rapidity which was always considerable but which was greater as the pieces of steel were thinner. Pieces as thick as the plate of a common joiner's saw were cut almost as rapidly as wood is cut by the saw itself. There is a very vivid corruscation of sparks flying off in the direction of tangents to the periphery of the cutting wheel and an intense ignition of the steel, extending for a considerable distance ahead of the section and on its sides, attends the operation. The impulse against the steel is so strong that in several instances it was thrown against the opposite side of the room with a velocity that might not have been without danger to a person standing in the way. . . . The steel, of course, loses its temper at the place of section and there only, for the softening extends but a little way and is limited to a narrow portion, marked by the iris colors known to be produced by heat upon steel. The iron plate, as Mr. Daggett says, becomes only warm and wears away only very slowly; yet it does wear, for the edges are left rough, and the channel of section in the steel exhibits, with a magnifier, minute striæ or grooves running in the direction of the wheel's revolution. I know not that there is any reason to suppose any peculiar electrical phenomenon, except that electricity always accompanies heat.

In 1824 Jacob Perkins of London, England, verified by experiments the facts set forth by Mr. Daggett and Professor Silliman. He carefully measured and weighed the disk of iron after continued use upon file steel and found no diminution in size or weight. He found that the disk has "acquired an exceeding hard surface at the cutting part."

Professor Silliman thought the phenomenon due to heat action, but expressed himself doubtfully. There appears to have been a widespread opinion that the friction between the rapidly moving iron disk and the steel in contact with it fused the steel at the place of contact or softened it so that it was pulled or rubbed away by the action of the disk, the rapid motion of the disk through the air causing the nearly instantaneous radiation of the heat from it.

Experiments in Switzerland.

In 1824 also Messrs. Darier and Colladon conducted very careful experiments at Geneva. Upon examining the edge of an iron disk used to cut steel they observed as did Mr. Perkins that it was as hard as file steel. Inspection through a miscroscope led them to think that the edge was set with small particles of steel. In conducting their experiments they selected a soft iron plate about 7½ inches in diameter and accurately centered and mounted it. They prepared a pendulum device for measuring velocities; they selected a number of gravers of most carefully tempered steel. By applying the gravers to the disk they found that with the disk rotating at a velocity of 34 feet per second the gravers cut the iron disk with facility; at 34 feet 5 inches the graver failed to cut as well, but was itself unaffected; at 34 feet 9 inches the graver was slightly attacked and the chips from the disk were less abundant; at 35 feet 1 inch the graver was decidedly attacked, and from this speed up to 70 feet per second the effect of the iron disk upon the steel graver grew more decided, while that of the graver upon the disk diminished. At velocities above 70 feet per second (or about four-fifths of a mile per minute) the iron attacked the steel and was itself unaffected. Their experiments led them to reject the heat theory and to assume that high heat is not necessary to the severing action, but is a mere incident. In order to determine whether the small steel particles found to be imbedded in the periphery of the disk were responsible for the action these particles were cut away and the disk again set in operation. It was found that the disk acted as effectively as before. Having heard that the Chinese were accustomed to cut diamonds by bringing them against an iron wheel rotating at high velocity the experimenters tried the effect of the disk upon rock crystal and agate. They found that both minerals were cut somewhat by a disk of soft iron rotating at velocities of from 130 to 200 feet per second (1½ to 2¼ miles per minute). They believed that at higher velocities, which they were unable to obtain, these materials would be still more readily attacked.

The theory of Messrs. Darier and Colladon is that the effect is due to what they call "choc"—percussion or impact—the soft iron acting on the hard steel very much as a ball of tallow acts when shot at high velocity into a wooden plank. They explain that when hard, elastic bodies such as steel or agate are applied to the edge of an iron plate moving at sufficiently high velocity their particles are displaced and torn off, but when a substance that is soft, such as soft steel, copper or iron, is applied to the disk of iron the substance is pressed before the iron disk and, being ductile, rises in burs.

Patents Refused in the United States.

This method was first presented to the United States Patent Office in 1874 in an application filed by Jacob Reese of Pittsburgh. The claim was refused in view of the publication in the *American Journal of Science*, above quoted from. In 1875 Messrs. Lakey and Mills of Turner Junction, Ill., also sought a patent for the same method, which was likewise refused on the same publication. Patents were, however, issued to each of these parties for the specific mechanisms contrived for carrying out the method. Reese devised his machine for cutting steel shafting and declared that with a speed of rotation of the disk of approximately four miles a minute a cast steel shaft 1½ inches in diameter could be severed in 60 seconds. Lakey and Mills designed their apparatus for cutting and shaping railway frogs and switches. Reese's disk was said to be made of iron or mild steel; that of Lakey and Mills of "soft fire box steel."

For many years this method has been in practical use in steel mills here and abroad for cold sawing steel rails, beams and plates. Many United States patents show machines employing the toothless cold saw or disk of tough iron or steel with high speed driving means.

Other Applications of the Method.

In 1883 Messrs. Nichols and Webb of Pittsburgh proposed to thread bolts by this method. They constructed a machine having a rotatable chuck for holding the bolt blank and arranged in parallelism therewith a high speed spindle carrying a "gang of smooth ribs or disks" spaced in accordance with the desired spacing of the threads to be formed on the bolt blank. The chuck carrying the blank was designed to be slowly rotated and the tool rotated at a high velocity in contact with the bolt blank and moved endwise at a rate of speed to form the correct

spiral. The inventors state that in operation the rapidly rotating tool is designed to "melt or fuse the metal of the bolt."

In 1884 John Pedder of Pittsburgh proposed to make compound plates of layers of steel and iron for use in the manufacture of safes. In the casting of the ingots for these plates the edges became chilled in such a manner as to prevent perfect welding during the subsequent process of rolling out the blank. This chilled edge he proposed to remove by the action of a toothless saw or smooth edged disk rotating at very high velocity. In the patent the action is designated as a fusing action.

In 1885 the Miltimore method and machines for dressing car wheels attracted widespread interest. Patents were obtained and assigned to the United States Car Wheel Dressing Company of Chicago. The patentee stated that his invention consists in "dressing metal bodies and at the same time hardening the surfaces of metal bodies by passing the surface to be dressed in close proximity to the edge of a rapidly revolving smooth metal disk whereby the surface is burned and melted to any desired depth." This method was alleged to be especially applicable to the dressing of those car wheels or other bodies which are made of chilled iron or highly hardened steel, and cannot consequently be successfully acted upon by any known cutting tool, and also "other bodies which are of soft steel which cannot be hardened by any of the common processes." The disk used by Miltimore was said to be of "very fine quality of steel so as to possess great tensile strength." The speed of rotation contemplated for the disk in practice was about five miles per minute. The theory of action set forth by the patentee is the fusion and burning theory. He notes that at the highest speeds the disk remains cool, while the object acted upon is not materially heated except adjacent the place where the disk is acting, while at lower speeds—say, less than two miles per minute—the disk becomes somewhat heated. Jacob Perkins and the Swiss investigators noted in the reports of their experiments that the active edge of the operating disk acquired great hardness. Miltimore states as a curious fact that the surface of the metal acted upon becomes very hard after the operation and that the surfaces of chilled car wheels become even harder than the original chill. He also notes, as did Mr. Daggett, the illusion of apparent want of contact between the disk and the metal operated on.

Disk Cutting of Armor Plate.

Within the last three years new and valuable uses have been discovered for this old method in its adaptation to cutting armor plate face hardened by the Harvey or Krupp methods, also to cutting modern high speed steel alloys, neither of which substances is capable of being cut practically by known cutting tools.

The prior practice in manufacturing and cutting to size modern face hardened armor has been to forge the plate from the steel ingot, then rough shear, then carburize the face, then cut nearly to size and shape by slow moving planing tools, leaving sufficient margin to allow for shrinking and distortion in the subsequent treatment. The plate was then heated and water quenched, making the face of glassy hardness. The marginal excess was then planed away down to the glassy, hard water quenched face portion, which had to be ground away by the slow process of moving the plate back and forth in contact with an emery wheel. The two cutting operations, one before hardening and one after hardening, were necessary because no tool could cut the water quenched portion and the plate had to be brought approximately to final shape before the hardening operation so as to be available for final grinding.

An iron or steel disk rotating with sufficiently high velocity may be readily passed through an armor plate, both soft back and glassy hard face. The preliminary cutting before hardening, previously necessary, may therefore be omitted if the toothless cold sawing process be adopted. It is said that the application of this method to cutting armor plate has reduced the time of cutting the plate to final size to about one-twenty-fourth of that previously consumed in bringing the plate to size by treatment with slotting cutters and grinding wheels. A Harveyized plate 6 inches in thickness and 10 feet long can be cut through by this method in one hour—a cutting speed of 2 inches a minute for a 6-inch plate.

The peripheral speed imparted to the disk in armor cutting operations has been between three and five miles per minute. Mr. Unger, superintendent of the armor plate plant at the Homstead Works, to whom is due the perception of the availability of this process as applied to the treatment of armor plate, found that a disk having a slightly notched edge is more efficient than one with a smooth edge. Binding of the disk in the kerf has been prevented by deluging the place of contact between the disk and plate with water.

High power has to be applied to run the disk at the necessary high velocity through armor plate. The operation is terrific and spectacular. At the first trial the operator in control of the machine that had been built to carry out the process was fortified behind a specially constructed shield of steel, and the threatening roar of the cutter as it passed into the thick plate of armor enveloped in fire drove the spectators appalled to cover.

Mr. Unger does not think that the action is that of fusing away the plate by the heat generated by friction. The fact that a disk whose edge has been serrated operates more efficiently than one whose edge is smooth he thinks is evidence that the operation is not that of melting. A continuous surface disk ought to progress through the plate more rapidly than a toothed disk if the action is a fusing one, because the smooth edged disk applies a larger friction surface to the material in a given time than the toothed disk. The sawdust from an armor plate cut by this method is one of two kinds—either flakes of steel having the characteristics of the metal being cut or a mass of oxide formed by the fused particles thrown down beneath the kerf and solidified into the form of a continuous ridge or miniature mountain range of iron oxide.

The Cutting of High Speed Steel.

This method has proved useful for cuttign high speed steel. Bars of such steel alloys can be easily severed by the swiftly moving edge of an iron or steel disk with an accuracy, neatness and speed unattainable by the old methods of nicking with a grinding wheel and then breaking, or heating, nicking with a cold chisel and then breaking. John Armstrong of Chicago found that a highly speeded disk of tough steel when applied to high speed steel will cut a clean kerf having no bur along its margin. File steel or other carbon tempered steel shows a bur along the margins of the kerf made by this process, due to the drawing of the temper and consequent softening under the high heat generated by the friction. Curiously enough, Mr. Armstrong found that a new, smooth edged cutting disk would not operate well upon high speed steel when first applied, but that after running the disk in contact with the steel for some time it would cut perfectly. He repeated the experience of the Swiss investigators before mentioned in finding the periphery of the disk very hard and apparently studded with particles of the steel upon which it had been operating—viz., high speed steel. His conclusion was that the cutting effect was due to the presence of the particles of steel in the edge of the disk, which is opposed to the conclusion of Messrs. Darier and Colladon. Mr. Armstrong found no evidences of fusion and believed from the character of the sawdust that the action was true cutting.

The philosophy of this interesting process has not yet beeen satisfactorily explained. The character of the process—the intense heat, the fiery corona surrounding the cutting disk, the terrific speed—renders it difficult to note sufficient facts connected with it to enable accurate conclusions to be reached. Probably the principal cause of the ability of the disk to eat its way through steel is percussion. The facts reported are believed to indicate this as the main factor in the action. Possibly heat may have something to do with it. Trial of the effect of such a disk upon some highly refractory metal, such as iridium, might furnish useful data toward the determination of this question.

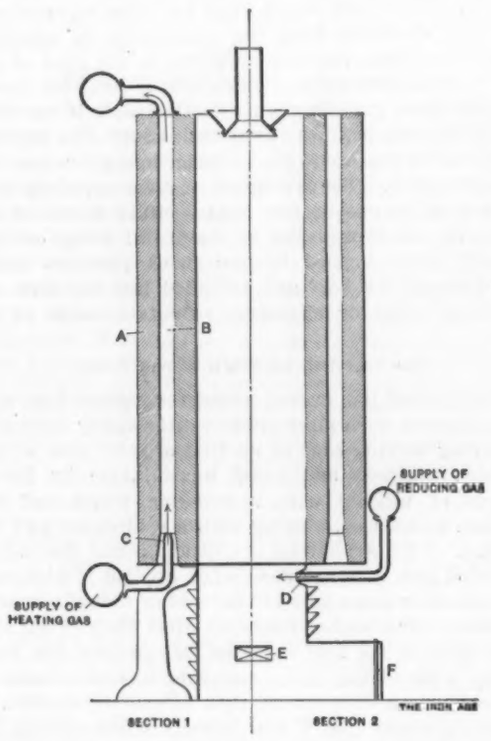
The early experimenters appear to have deemed it necessary that the disk or tool should be of soft iron hav-

ing a smooth edge. Later investigation shows that the tool may be made of either iron or steel, provided its tenacity is sufficient to enable it to withstand the strain of the centrifugal force and resist the tearing tendency of pressure in the kerf. Later investigation indicates also that a smooth periphery is not necessary, but that the disk is more efficient if slightly notched.

Blast Furnace Gas as a Reducing Agent for Open Hearth Ore.

Writing in *Stahl und Eisen*, Oskar Simmersbach of Duesseldorf describes a recently patented process for the reduction of ore by means of furnace gas, the immediate product being spongy iron, which is subsequently melted in the open hearth furnace. He draws attention to the fact that modern processes, involving the use of direct metal in regenerative furnaces have made the ore additions a considerably more important factor than formerly.

As the metallic iron in ore costs considerably less than pig iron, and its separation is effected by surplus



Sectional View of Special Furnace for Reducing Ore with Blast Furnace Gas.

heat at nominal expense, the quantity of ore used has a marked influence on the ingot cost sheet. The greater the amount of this surplus heat and the shorter the time of the heat in the furnace, or, in other words, the less the oxidation of carbon, phosphorus, silicon and manganese of the bath is effected by the gas and the greater the amount of these elements present, the greater is the quantity of ore which can be used and the greater are the pecuniary benefits.

Of the elements mentioned, the phosphorus, silicon and manganese are of less importance than the carbon, but the percentage of the latter in the iron is limited, so that an increase in the ore above a certain amount is useless. It has therefore been suggested to raise the carbon content of the bath by the addition of carbon and thus make possible an increased reduction of ore. Such addition would, however, take considerable time, as, on account of its low specific gravity, it is not easy to force the carbon through and under the covering of slag. Further, the increased use of ore lengthens the time of the heat, thus diminishing the production and raising the cost and the thought occurs naturally that these disadvantages might be avoided by a previous reduction in a separate furnace.

The reduction of iron ore can be effected either by solid carbon or by carbon monoxide. Experience has proved that the former is too expensive, the cost approaching closely to that of pig iron in the blast furnace, while, as the teachings of thermochemistry also show, the use of carbon monoxide makes a much cheaper reduction possible. According to von Jueptner, the gain or loss, expressed in calories, in the reduction of 1 km. of metallic iron is as under:

From.	By solid carbon.	By CO.
FeO	— 832	— 137
Fe_3O_4	— 943	— 47
Fe_2O_3	— 1,058	+ 1

This shows that the effort made to effect the reduction of the ores by means of carbon monoxide as much as possible is right. Some varieties of ore are entirely reduced by the gas in the blast furnace, so that the latter is rightly regarded as the most efficient reducing apparatus. It must not be forgotten, however, that in the upper part of the stack, at a temperature below that necessary for reduction, the carbonic acid formed reacts with solid carbon to form again the monoxide and that the carbon thus used is a direct loss, which makes the reduction by carbon monoxide in the presence of solid carbon more expensive than would otherwise be necessary.

On the other hand, the same reaction between solid carbon and carbonic acid causes the gas at the top of the furnace to have the same composition as that in the zone of reduction, and in consequence it must have the same reducing power. It follows that if the furnace gas be used merely to reduce the ore and not to simultaneously melt the iron, for which purpose the presence of solid fuel is necessary, the unavoidable disadvantage of the blast furnace—namely, the combustion of coke by the agency of carbonic acid—is overcome, and apart from the relative value of the gas a reduction cheaper than that of the blast furnace is made possible. Works making open hearth steel from direct metal have therefore in their surplus blast furnace gas a cheap reducing agent.

The means for putting to practical use the principles outlined above are set forth in the accompanying illustration showing two vertical sections of a special furnace built for this purpose. The furnace is heated by burning the gas from the burners C in the flues B, formed in the lining A. By means of the heat passing through the brick work the gas for reduction, which is admitted without air at D, and the ore, which is charged through the bell at the top of the furnace, are both heated to the necessary reducing temperature, 800 degrees C.

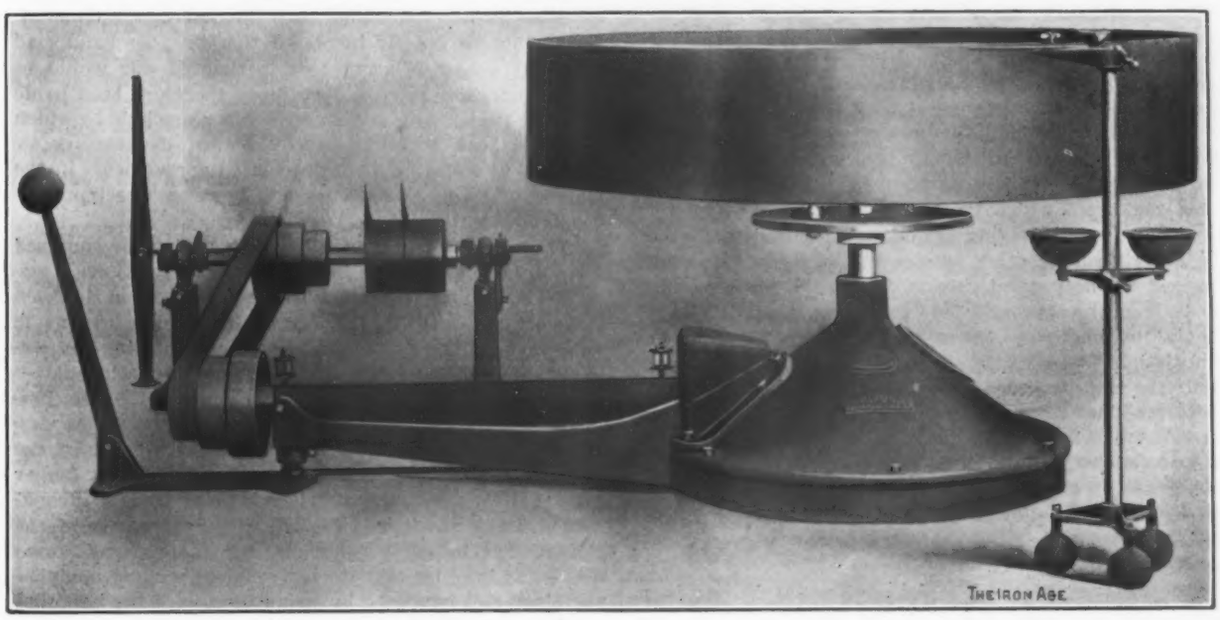
In order to facilitate contact between the ore and gas and thereby attain as rapid and complete reduction as possible it would be advisable to draw the gas through the column of ore by means of an exhauster or some similar means. The resultant iron sponge is cooled off by water in the lower part of the furnace to avoid subsequent oxidation and is then removed, either through the opening E or the door F. It would be necessary in order not to interfere with the proper transmission of heat that the walls should not be too thick or the sectional area too great, unless it is intended to preheat the reducing gas. There is no reason why any other gas containing carbon monoxide, as, for instance, producer gas, should not be substituted for that from the blast furnace.

Experiments in Switzerland with an electric locomotive weighing 44 tons, where the line voltage was 15,000, showed that on a level track a speed of 18 miles per hour with a dead weight of 200 tons could be obtained in 57 seconds. On a grade of 0.8 per cent., a maximum speed of 18 miles per hour was reached with the same load. The efficiency of the equipment from the generator to the axles of the locomotive is given at 69.5 per cent., accounted for as follows: Locomotive step down transformer 98.5 per cent.; motor generator, 85 per cent.; motors and gearing 86 per cent.; line losses, 0.5 per cent.; exciter and air pump consumption, 2 per cent. The average power generated was 310 kilowatts, while that utilized was 216. The consumption on a level road was 23.7 watt-hours per ton-mile.

The Seymour Rotary Balancing Machine.

For perfectly balancing pulleys, fly wheels, cutter heads and other rotating parts of machinery the Defiance Machine Works, Defiance, Ohio, builds the Seymour patent rotary balancing machine herewith illustrated. While the machine shown is especially heavy, being capable of swinging objects weighing up to 2500 pounds, it is equally well adapted for balancing the lightest work. The frame is conical in form and is cast in one piece, in the center of which is placed a vertical steel spindle standing in a step bearing in the base of the frame and passing a short distance above through a bearing at the top of the frame. This spindle at its upper end carries a face plate provided with two driving pins which project upward parallel to the axis of the spindle. A steel lathe center with taper shank is fitted into the vertical spindle and upon this rests the object to be balanced.

The vertical spindle is rotated through friction gearing driven by a horizontal shaft at the base of the machine. This shaft is movable longitudinally by the counterweighted lever at the left, which is used to engage and disengage the friction drive, the weight serving to hold the shaft in either position. In using the machine it is best to disconnect the drive when making the test for proper balance and to allow the object to rotate by the momentum it has acquired while the driving force was exerted, for the reason that the driving pins when pressing against the arms of the object are likely to produce uneven rotation.



The Seymour No. 2 Rotary Balancing Machine, Built by the Defiance Machine Works, Defiance, Ohio.

To balance any object, a plug having a conical cavity at one end is first inserted in the bored hole of the hub slightly above the center of gravity of the object. Before starting the machine a standing balance is obtained by attaching weights as in the usual method. The object is then rotated and the parts that run out are marked, and by adjusting the weights in a vertical plane only the running balance is effected without destroying the standing balance.

This machine is well adapted for determining all the conditions necessary to perfect rotating balances, even at the highest velocities, and it is claimed that more objects can be balanced in a given time than by the older method. The No. 2 machine illustrated weighs about 4200 pounds.

In diamond drill boring a solid core of rock is removed in sections, enabling accurate determination of the character of the rock formation throughout the depth of the bore, and this without the great expense of sinking a shaft. On the gold bearing reefs of the Transvaal borings of great depth have been made, the two deepest recorded being each more than one mile—5582 feet in that near Johannesburg, which required nine months for sinking, and 5560 feet in the one near Doornkloof, the boring of which occupied 14 months. In each case the core removed from the boring had for the greater part of the depth a diameter of 1⅜ inches. It is interesting to know that the machinery used in the South African fields for this work is nearly all imported from the United States.

Heavy Refractory Brick Orders.

The Harbison-Walker Refractories Company, Pittsburgh, reports the demand for its products as very large and constantly increasing. Some of the larger contracts on which it is now shipping or which it has recently completed are as follows: Blast Furnaces and Stoves: Brick for complete lining for pipe connections, boiler settings, &c., one blast furnace and four stoves, Midland, Pa.; for two blast furnaces and eight stoves, Youngstown, Ohio; for one blast furnace and four stoves, Chicago, Ill.; for three complete furnace linings, Sydney, Nova Scotia; for two complete furnace linings each to Bethlehem, Pa., and Buffalo, N. Y.; for one complete furnace lining, Wharton, N. J.; Detroit, Mich.; Canal Dover, Ohio; Sharpsville, Pa., and Harrisburg, Pa., and for complete linings for nine stoves to an Eastern iron company. These orders call for approximately 17,125,000 brick. Beehive Coke Ovens: 1,700,000 brick for the Territory of New Mexico, 1,000,000 for the Connellsville Basin Coal & Coke Company, 700,000 for the West Virginia Coal & Coke Company, 200,000 for the Perry Coke Company and 1,000,000 for the Washington Coal & Coke Company. By-Product Coke Ovens: 2,500,000 brick for the Harrisburg district. Many orders have been received from cement manufacturers, including one for complete linings for 15 rotary kilns for Kansas and Texas.

The company is also experiencing an exceedingly large demand for silica brick for open hearth steel furnaces, glass furnaces, copper furnaces, &c., and for magnesite and chrome brick from open hearth steel works, copper works, &c., and also a large run of carload orders from regular consumers for all classes of refractory materials. As contracts for refractory material are usually placed considerably in advance of the date of completion of plants the Harbison-Walker Refractories Company is in a favorable position to judge of the possibilities and prospects for the future. The very large demand for such material is considered an excellent indication of an active state of business for some time to come.

The Army Ordnance Report.

WASHINGTON, D. C., December 19, 1905.—The annual report of the Chief of Ordnance of the War Department will attract more than usual attention among manufacturers. General Crozier makes a very interesting statement with regard to the efforts the Bureau is making to develop a cost system that will enable the Department to compare the prices of private manufacturers with the Government's cost of production, a comparison that in many cases will serve to determine whether certain articles shall be manufactured at the various arsenals or purchased under contract. He also furnishes the details of certain tests to determine the comparative accuracy of ammunition made by the Department and by private manufacturers, and describes an investigation made by the Bureau into the phenomena of streaked forgings. In reporting upon the operations of the various arsenals General Crozier gives some information with regard to experiments in shop practice that will be of general interest.

Cost System.

In speaking of Government manufactures it is commonly stated that the reported cost does not represent the real cost to the Government, inasmuch as the reported cost is that which is paid out of the special appropriation authorizing the manufacture of the articles only, and the statement is in general true. For example, when gun carriages are manufactured at the Watertown Arsenal their reported cost is only that which has been paid out of the appropriation generally made in the Fortifications act, from which the money for their construction has been allotted, leaving out of consideration the pay of the superintending army officers and of the enlisted men engaged in the general care of the establishment, which comes from the appropriation "Pay of the Army"; general repair and improvements of the buildings, from the appropriation "Repairs of Arsenals"; clerical expenses, from the appropriation "Ordnance Service," &c. It is quite possible, however, to take these into account, and an effort has been made to do so, thus including in the cost of articles manufactured all the above mentioned expenses and in addition interest on the value of the plant, its deterioration, allowance for losses by fire, and in general all those expenditures which a private manufacturer must take into account, except profit.

In the case of the Frankford Arsenal it has been found for the year 1904 that the cost paid from the allotments from the appropriations must be increased by 9 per cent. in order to cover the expenditures made from other and more general appropriations and the fixed charges; for the Springfield Armory the increased cost is 14 per cent. and for the Rock Island Arsenal it is 11.4 per cent. Recent price-lists have been prepared with additions to the allotment costs due to the above percentages, and these price-lists therefore represent the entire cost to the Government from whatever source funds have proceeded.

Government vs. Private Manufacturers.

On July 9, 1904, a test was conducted at Sea Girt, N. J., by a committee of the National Board for the Promotion of Rifle Practice to determine whether the ball cartridges, model of 1898, made at Frankford Arsenal, were equal in accuracy at long ranges to those made by four different private makers. The committee unanimously decided that the Government ammunition was not as reliable at 1000 yards as that of private makers. Fifteen targets were made by the committee and as all of the shots fired for each target were direct hits in only two of them the correctness of the conclusions drawn from such incomparable data seemed inadmissible, especially as it was admitted by one firm that the cartridges of its make which had been used in the tests were specially loaded by hand. The tests were therefore repeated at the Springfield Armory under the conditions prescribed by the committee, with results much more favorable to the ammunition made at the Frankford Arsenal. The tests were again repeated about six months later, the ammunition of private makers being purchased from dealers and that made at Frankford Arsenal being taken from lots manufactured before the date of the first test. The second test was again creditable to the Government product.

It is claimed that the shell and primer for caliber 0.30 ammunition made at Frankford Arsenal are not excelled by those produced by any private manufacturer. It is therefore believed that any material improvement made in the Government cartridge must be confined to its two other components, powder and bullet, and to the method of loading. The Department is constantly urging powder makers of this country to improve their product and it is believed they are endeavoring to meet the Department's wishes. Although reports indicate that some foreign made powders give better results than those made in this country it is not deemed wise to adopt a foreign powder, since the home product only could be depended upon in time of war. And, moreover, home industry should be encouraged in military material, and there is good prospect of its improvement. An exhaustive series of experiments made with different designs of bullets has shown that the Government design gives equal, if not greater, accuracy than any. The accuracy of the Government ammunition could be improved by substituting hand loading by weight for machine loading by volume, but the cost of the ammunition would be greatly increased thereby. To hand load the daily output of cartridges in time of war would be utterly impracticable. Efforts have therefore been made for some time past to design or obtain a machine by which cartridges can be satisfactorily loaded in quantity by weight, but so far without success. Improvements in the method of loading cartridges are, however, receiving the constant attention of the Department.

That private plants in this country might be equipped for and have experience in the making of small arms ammunition, which is needed so desperately and in such large quantities in time of war, contracts have been made with each of the following firms for furnishing the Department with 3,216,000 ball cartridges, model of 1903—viz.: The Union Metallic Cartridge Company, the Winchester Repeating Arms Company and the United States Cartridge Company. Although the price bid by each of the three companies was the same and considerably higher than that for which the cartridge is being made at Frankford Arsenal, yet it was deemed to the advantage of the Government to make contracts, for the reasons stated above and in order that the Government product might be sustained and improved by comparison with the best that can be produced by private effort.

Streaked Forgings.

The matter of streaks in steel forgings for guns continues to be a subject of investigation. These streaks, as has been reported, are believed to indicate either a want of continuity or a lack of perfect structural homogeneity in the metal, more probably and certainly much more frequently the latter. The streaks are made apparent by certain kinds of tools or cuts and feeds in the careful and accurate machine finishing to which gun forgings are subjected. They appear as bands on the surface of the steel, due to the fact that the band reflects light from a different angle than the general surface. They appear when viewed from a distance only. Close and careful inspection of the surface—such, for example, as light etching or coloring with iodine facilitates—may show that the streaked appearance is due either to local variations in the physical properties or to the presence of short lines or dots indicative of minute structural unsoundness. In the case of structural unsoundness the tensile strength of the steel across the streak is impaired, and with the lowering of tensile strength the development of elongation is restricted, this latter feature being incident to the former. In the direction of the streaks the strength of the metal is not affected.

The shapes and positions of streaks are modified by the forging operations, and, generally speaking, tangential specimens are not likely to show their presence, though occasional oblique fracture of such a specimen in test will be determined by them. Radial specimens make their presence manifest and in test show the

impairment of tensile strength which has been mentioned. These radial specimens do not of course represent the direction of the principal stresses in the gun, but their test shows the maximum effect on the structure of the presence of a streak. The investigations already made have developed to a certain extent what streaks are, but have thrown very little light on the question of their source. It seems probable that any structural unsoundness must have its origin during the period of casting or of cooling the ingot. The most promising field of inquiry seems to be therefore the ingot itself, for the operations of forging tend to obscure or even obliterate the condition in the ingot which is developed into the streak in the finished gun forging. Investigation along these lines must of course take very considerable time and be expensive, but the possibility that the information gained might lead to a discovery of the means of improving structural conditions would, it is thought, justify the expenditure of the necessary time and money.

Work of the Arsenals.

Rock Island Arsenal.—One hundred and thirty-six machines of various kinds have been added to the plant of the Rock Island Arsenal during the year, most of them being procured for completing the plant of the principal machine and gun forging shop and also for the final equipment of the armory shops for the manufacture of the United States magazine rifle. In the foundry a novelty has been introduced in the installation of a number of molding processes by which the labor cost of work formerly done by hand has been reduced about 18 per cent. and the loss from defective castings also reduced to nearly the same extent.

Springfield Armory.—Extensive investigations have been made extending over the past year to determine the possibility of increasing the life of the barrel of the magazine rifle, including tests to determine the effect upon accuracy of the deposit made by the bullet during its passage through the bore and the effect upon the life of the barrel caused by changes in the form and number of grooves of the rifling and in the composition and treatment of the barrel steel. Manufacturers and dealers in steel were invited to submit samples. Five samples of barrel steel used by foreign countries were received, and these, with samples submitted by the best-known manufacturers in this country, were subjected to a comparative test with samples prepared at the armory. The results showed clearly that the loss in efficiency of the barrel is due almost entirely to erosion occurring at and directly in front of the seat of the bullet. Investigations now in progress have for their object the reduction of this erosion, but the principal difficulty experienced is that the steels that resist the erosive action of the powder gases are as a general rule exceedingly difficult to machine. There is every reason to believe a more satisfactory steel will be found than that now used in the manufacture of this rifle.

Frankford Arsenal.—A shrapnel of new design has been developed at this arsenal during the year. This design was prepared with a view to overcoming the defects and weaknesses inherent in the hexagonal shrapnel and the necessity for using the expensive steel jacketed lead ball. The case is pressed or forged from a high grade of steel and is designed to have sufficient strength to meet with a factor of safety all the conditions imposed by the use of the base charge.

Watervliet Arsenal.—The application of individual motors to the gun lathes in the north wing of the seacoast gun shop has been completed and the results have more than fulfilled expectations. The output of the lathes has been increased, the control has been made more simple and the increase in efficiency has been considerable. A motor generator set of 160-kw. capacity has been installed and the power is supplied by the Hudson River Electric Company. The service has thus far been very satisfactory. The extension of electric transmission of power throughout the gun shop has progressed satisfactorily and will be completed during the coming year.

Watertown Arsenal.—The small plant for the production of steel castings recently installed has been operated throughout the year and its product has been on the whole very satisfactory both as to soundness of castings and physical qualities. The operations have been extended to the production of ingots to be used in the smith shop in the manufacture of small forgings, and this step has been attended with such excellent results that the practice of buying ingots or billets for small forgings has been practically abandoned. Sixteen new machine tools have been installed in the machine shop during the year. The installation is yet too recent to permit full realization of the benefits to be derived from the changes already made, and there still exists the disadvantage which has been mentioned in previous reports consequent upon the use of a large number of old machine tools not adapted to high-speed work. To meet present demands a new electric generating unit with engine should be installed as soon as possible of such type that it may be utilized in any approved project for equipping the shop throughout with modern tools and motor drive. The testing laboratory has been busily occupied with current arsenal work, private tests and tests of an investigative character. In the last named class there has been continuation of the tests on frictional resistance of jacketed bullets forced through service rifle barrels, the examination of gun forgings with reference to the subject of streaks and the investigation of the endurance of steels against repeated stresses. Tests of ball bearings have been made and a special apparatus is in process of construction to extend this series of tests under different conditions of loads and speeds. A 17-ton steel ingot treated by the Hermet process and purchased from the manufacturers at Duesseldorf, Germany, has recently been received for examination and test to determine whether homogeneity of metal exists throughout the ingot and whether it would be advisable to require ingots so treated to be used for ordnance forgings.

W. L. C.

Meeting of Boring Mill Manufacturers.

The manufacturers of boring mills held a meeting at the Hotel Lafayette, Buffalo, N. Y., December 13, in accordance with the call issued at the conclusion of the special meeting of the National Machine Tool Builders' Association, which took place in New York December 4 and 5. J. Morton Poole was elected chairman and L. H. Colburn secretary. The following companies were represented:

Bullard Machine Tool Company, Bridgeport, Conn.
Bausch Machine Tool Company, Springfield, Mass.
King Machine Tool Company, Cincinnati.
Rogers Machine Tool Company, Alfred, N. Y.
Colburn Machine Tool Company, Franklin, Pa.
J. Morton Poole Company, Wilmington, Del.
Gisholt Machine Company, Madison, Wis.

Questions of importance were discussed pertaining to boring mill trade interests, among which was the matter of advance in prices, and it was the sentiment of all present that the existing conditions warranted an advance and that the prices of boring mills should be raised. It was also the sentiment of the representatives present that it would be advisable for such boring mill manufacturers to become members of the National Association of Machine Tool Builders as have not already joined.

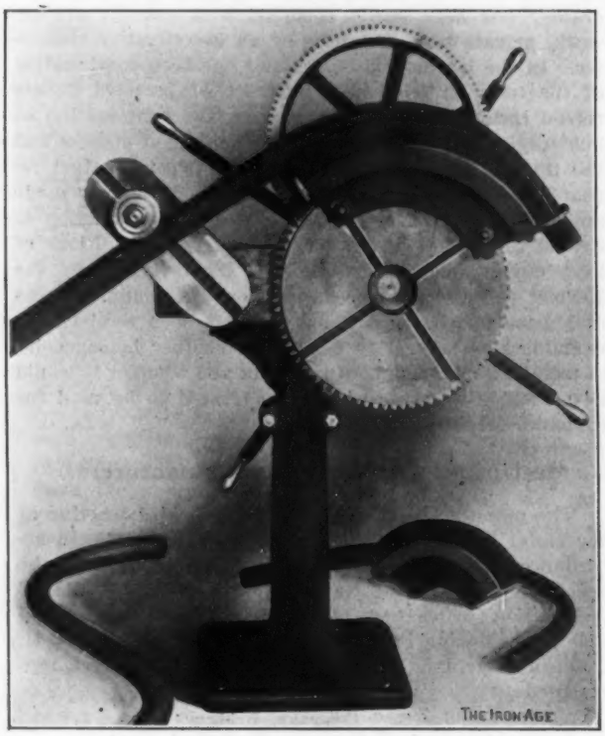
Freight cableways for the landing of cargoes are used at Manãos, South America, 1000 miles up the Amazon. Vessels discharge at moored floating landing stages adjoining a pontoon carrying the head towers of three 2-ton cableways with a span of 550 feet. Power is supplied by a 75-horse-power direct current motor operating at 250 volts. The shore ends of the track cables are free, passing over sheaves on the tail towers and carrying a 10-ton counterweight in guides. It follows that the load upon the cables can never exceed that due to the counterweight alone. The cableways are of the double track type and discharge between warehouses on shore.

We have an inquiry from a large manufacturing company for the names of parties who make a specialty of supplying case hardened or decarbonized steel in special shapes. We will be glad to be advised of those who are in a position to furnish this class of material.

The Pedrick & Smith Pipe Bender.

A machine for bending pipe cold has recently been perfected by Pedrick & Smith, Church lane and Reading Railroad, Germantown, Philadelphia, Pa. Pipe up to and including 2 inches in diameter of steel, iron, brass, copper or other material can be bent cold. The machine is also adaptable by means of special formers for bending light angles, flats and T-bars. The gearing is compound with a ratio of 25 to 1, giving the machine a powerful leverage, consequently a 2-inch pipe can be bent with little effort.

The machine is operated by a four-armed hand wheel, which through the gearing rotates the face plate and the attached bending quadrants. The pipe is held in the quadrant by inserting the end through a hole in a steel plate on the quadrant and the resistance stud on the movable arm engages the free end of the pipe. Various curvatures are obtained by adjusting the arm, which has



Pipe Bending Machine Made by Pedrick & Smith, Philadelphia.

a swing of three-quarters of a circle, supplemented by the movement of the resistance stud in the T-slot of the arm. The machine is mounted on a telescopic stand, which can be raised or lowered to any suitable hight. When the base is fastened the upper part swivels. A universal arm or section for the stand is furnished, so that if desired the face plate may be placed in a horizontal position at any hight from the floor.

Quadrants are furnished with the machine for 1-inch pipe with a radius of 6 inches, for 1¼-inch pipe with a radius of 9 inches, for 1½-inch pipe with a radius of 12 inches and for 2-inch pipe with a radius of 14 inches. It has been found that smaller sizes of pipe can be readily bent in any of the quadrants intended for larger pipe. For that reason it is not necessary to take the time to change quadrants unless a shorter radius is desired than the quadrant in use will give.

The National Founders' Association has issued a pocket directory containing the names of all its officers and district committees. The committees of the Fourth and Sixth districts had not organized when the list was printed in *The Iron Age* of November 23. In the Fourth district Wm. Gilbert, Buckeye Foundry Company, Cincinnati, was made chairman, and Irving H. Reynolds, Wm. Tod Company, Youngstown, Ohio, vice chairman. O. B. Kinnard, Kinnard-Haines Company, Minneapolis, was elected chairman in the Sixth district, and H. M. Wallis, J. I. Case Plow Works, Racine, Wis., vice chairman.

The Pope Mfg. Company.

The Pope Mfg. Company, which took over the properties of the defunct American Bicycle Company, has issued its report for the fiscal year ending July 31. The net profits for the year were $87,220, against $50,993 the previous year. The income account, as compared with the fiscal year 1904, is as follows:

	1905.	1904.
Gross receipts	$7,801,145	$7,226,589
Expenses and costs	6,496,359	5,995,793
Net earnings	$1,304,750	$1,230,796
Other income	754	62,158
Totals	$1,303,996	$1,292,954
Charges, &c	1,216,776	1,241,961
Surplus	$87,220	$50,993

Reviewing the year's operations, President Albert A. Pope says:

In the reorganization of the business of the company the industries in several of its factories and in those of some of the subsidiary companies were found to be not only unprofitable but of a description that it seemed impossible to continue at a profit. The liquidation of such industries seemed to be therefore inevitable, and thus far has been accomplished, I believe, with the least possible loss, though time has been required to do this work in such a manner as to produce the best results for the company. Other departments of the company have, on the other hand, shown large profits, which have been nearly absorbed by the losses and expenses of liquidation and the cost of maintenance of unoperated factories, the latter item amounting for the year to $90,264.

These unavoidable burdens on the earnings of the company are, I believe, largely a matter of the past, the liquidation of unprofitable departments being nearly completed and factories not operated by the company having been leased or otherwise disposed of. The evolutions in the business have made necessary the purchase of a large quantity of new and modern machinery for the greater economy of manufacture, and now our operated factories are well equipped and in excellent condition to produce goods satisfactory in quality and cost. The manufacture of automobiles, which is now the largest part of the business of the company, is a comparatively new industry, and it has taken much time and money to experiment and produce goods of a standard quality. We believe that we now occupy a high position in the line of manufacture of these goods and that further expenditures in this direction will be limited.

The current assets of the company are $3,993,418. The current liabilities are $1,182,725. The real estate and buildings and their equipments of machinery are all in fine condition, and there is no bonded indebtedness or lien of any description on the property. Reserves have been created out of the earnings for the renewals of machinery and equipment and for doubtful accounts receivable, and internal profits between departments and subsidiary companies have been eliminated.

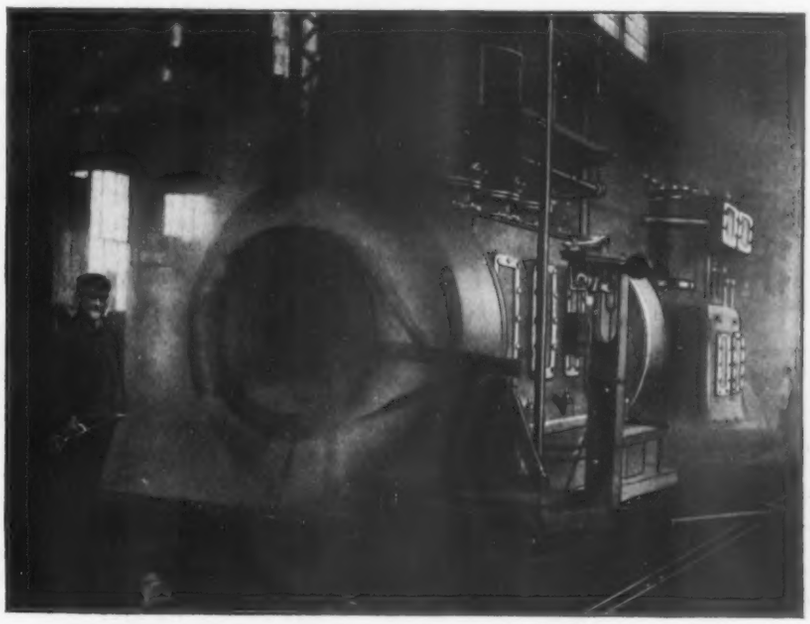
The Detroit & Cleveland Navigation Company has accepted the designs of Frank E. Kirby, Detroit, for a new passenger boat, to cost $1,200,000 and to be ready for the season of 1907. The boat will be the finest on the lakes and will have the greatest beam—91 feet. There will be four decks and a passenger elevator and a sprinkler system will be features. The engines will have three cylinders and be of 7000 horse-power, capable of propelling the boat 20 miles an hour.

The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has perfected a new line of three-phase core type transformers for 60-cycle circuits. One of these transformers may be used where three-phase transformation is to be made instead of two or three of the single phase type. They are self contained units of compact construction, are generally easier to install and reduce the complexity of wiring between the transformer and the apparatus to be supplied.

Testing of High Power Modern Gas Engines.*

BY WILLIAM H. SPILLER.

A great many do not know that the modern gas engine has to undergo prolonged and severe test in the factory. The duration of the test varies from one week to 15 days, according to the size of the engine, the work it has to perform and the distance it will be shipped. As engines are sold under a positive guarantee covering consumption of fuel per horse-power per hour, workmanship, material and general efficiency under actual operative conditions, the reason for the exhaustive testing is at once apparent.



A 300-Horse-Power Producer Gas Engine Under Test.

The first tests are made by the chemist, who analyzes the iron or steel as received, and this analysis must tally with the specifications for the particular grade required for certain parts of the machine. When a heat is run a test piece is made to show the ultimate or breaking strength and then the unit stress per square inch with a proper factor of safety for the material is determined. The factors of safety in gas engines are high on account of the complex strains in some of the various parts. When a casting has been made it is tested by powerful blows to ascertain if it is perfect, and this will show if there are any thin or weak spots in the walls of the cored chambers. After the cylinders have been finished and before assembling the engine they are tested under hydraulic pressure. The various materials and parts of the engine having passed these preliminary tests are assembled, and the cams and gears are set correctly for the proper timing and igniting of the gases in the cylinders and the valves in proper position for admitting and exhausting the gas. The engine is then ready for its initial run. In this an indicator is used and a card is taken from each cylinder.

Large engines are started by compressed air admitted through an automatic starting valve to one cylinder and the engine operates by this means until gas has been drawn into the other cylinders, compressed and ignited; then upon shutting off the compressed air and admitting gas to the first cylinder the engine assumes its operation upon gas. The compressed air is supplied by a small 2 or 3 horse-power gas engine driven air compressor.

The indicator cards taken from the engine show the compression in pounds per square inch of the mixture of gas and air, the pressure of the burning gases after ignition, the pressure of the exhaust; also whether the intake and exhaust valves are set properly for highest economy and whether the igniters are timed accurately for greatest power. The valves on these large engines being operated positively and provided with a device for adjusting to the one-thousandth part of an inch, an excellent opportunity is presented for securing the best efficiency and economy.

The brake test is the most important from the purchaser's standpoint. In making this test of the brake or delivered horse-power a prony brake is used. This consists of a large cast iron ring, having both inwardly and outwardly projecting flanges. The inner flange serves as a trough to hold the cooling water necessary to absorb the heat developed. The outer flange on the ring retains the steel brake strap, to which shoes of wood are riveted. This strap is tightened by two hand wheels at the back to regulate the friction on the drum. Lubrication is supplied from pieces of tallow placed between the blocks of wood. The drum is bolted to the fly wheel and the brake arm rests upon a wooden column on the platform of the scales through which the tendency to rotate is measured in pounds. The engine is run at normal speed and the strap is tightened until the speed of the engine remains constant and the required load is carried by the engine.

The photograph reproduced herewith shows a test being made of a 300 horse-power producer gas engine operating upon pea coal and consuming less than 1 pound per brake horse-power per hour. It was taken in the factory of the Weber Gas Engine Company, Kansas City, Mo. At the time the picture was taken the engine was delivering about 350 horse-power and the clouds of steam from the brake obscured part of the view.

* Abstract of a paper read before the Technological Society of Kansas City, Mo., December 7, 1905.

A collection is being made at the Washburn Shops of the Worcester Polytechnic Institute of castings designed to illustrate the various changes which produce imperfections in the work. These castings are, as far as possible, all made from similar patterns, and they will show the straining or the swelling of the casting, due to soft ramming, as well as the effect of ramming too hard, the effect produced when a portion of the mold is insufficiently secured—that is, a "drop"—and the effect of building up the joint between two parts so as to cause a "crush." The chucking of badly fitted flasks and the result of poor venting and defective gating will be shown and the relation between temperature and the molten iron and the size of gates will have their illustrations. The castings will also demonstrate the effect of particles of foreign matter in the mold, as well as the result of pouring the iron when it is too cold and that of pouring it intermittently. The exhibit is designed primarily for the benefit of students.

Very fine iron sand found in New Zealand and heretofore useless on account of the difficulty in smelting it is now successfully used by a new process. The sand mixed with carbon is passed through an electric furnace so as to fall in a shower in a zigzag path through a number of carbon grids heated electrically. It is thus melted and reduced and caught in a suitable receptacle below. The charge is met in its downward path by reducing gases. The whole furnace is sealed against the air for the protection of the grids, which are horizontal and built into a framing, also of graphite. The twelve grids are connected in parallel and supplied with current at a pressure of 18 volts. On a consumption of 100 kw. the furnace is said to be capable of taking care of 280 tons of the iron sand per annum.

The Fischer Gas Reversing Valve.

It is evident from the large number of practical experiments and theoretical suggestions being made for devising a suitable regenerative furnace valve that those in use do not give complete satisfaction. Every engineer working with such valves is desirous of getting an apparatus that is thoroughly reliable. What is desired is an absolutely tight valve that will keep tight. The valves in general use either work with faced surface or with water seal. Both of these ways have disadvantages. At the high heat the face surface iron warps after a short time and is then rapidly destroyed. In the case of the water seal the hot gases coming in contact with water are cooled considerably, a part of the water being carried in the form of vapor by the gases to the furnace, thereby deteriorating the gas.

Albert Fischer, a German engineer, of the firm of Fischer & Demmler, Mülheim a. d. Ruhr, has succeeded in building a valve which overcomes these difficulties. A Fischer valve can be put in without changing the brick work and the present gas connection. It is of simple construction, as can be seen from the illustrations and from the following description:

The Fischer valve consists of three main parts, namely, an inner cylinder with a wall across; an outer cylinder which is made in four compartments with four ribs, and the base plate.

The inner cylinder *a*, Fig. 1, is pressed by the weight *b* to the lower face *c* of the upper ring, whereby the upper joint is kept tight. The space of play between the inner cylinder and outer cylinder can be made as desired, and the connections between the two cylinders are made by four ribs, *d*, Fig. 2, which effect a tight joint on the sides. These four ribs are pressed by the weights *e*, Fig. 2, against the inner cylinder. The ribs *d* can be lifted by loosening the bolt *i*, Fig. 3, whereby a connection is made from producer to stack for burning out the pipes, &c. The lower joint is made tight by having the inner cylinder resting in sand, *k*, Fig. 1, on the base plate. The pieces *l* prevent a throwing out of the center. The inner cylinder rests in the ball bearing *o*, which allows easy handling, and rests on the button *p*, Fig. 1, whereby an absolutely horizontal position of the inner cylinder is effected.

It can be seen from this description that the Fischer valve is absolutely tight and does not allow the gas to escape in any direction. Another important advantage is the point that during the changing of the position of the valve the connection between stack and producer is absolutely shut and that the gas contained in the chambers and pipes is going to the furnace.

With the valves in general use, even at a short shutdown the chambers and furnace cool off considerably, as the slide valve in the stack is never absolutely tight.

The Fischer valve, on the other hand, is absolutely closed by a half turn. The prevention of leakage and the avoidance of loss and deterioration of the gas when

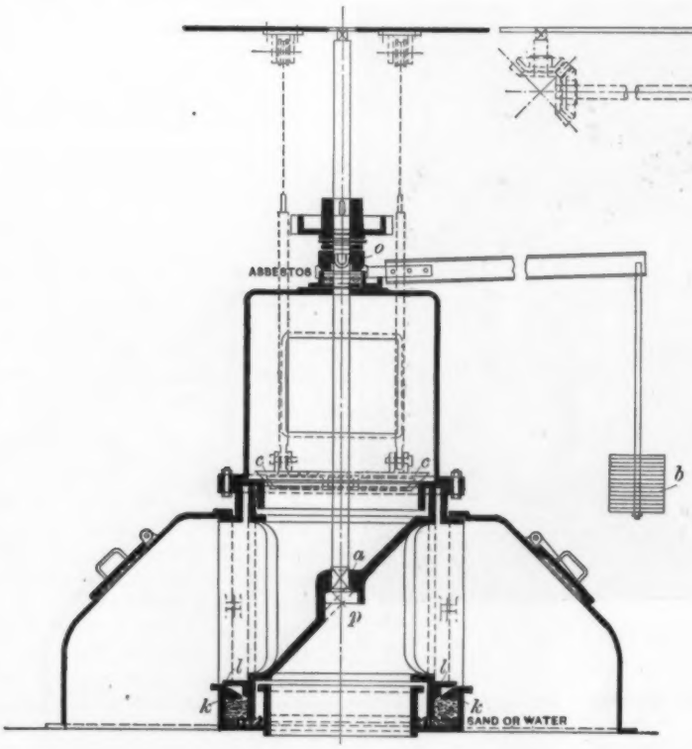


Fig. 1.—Vertical Section through the Center of the Valve.

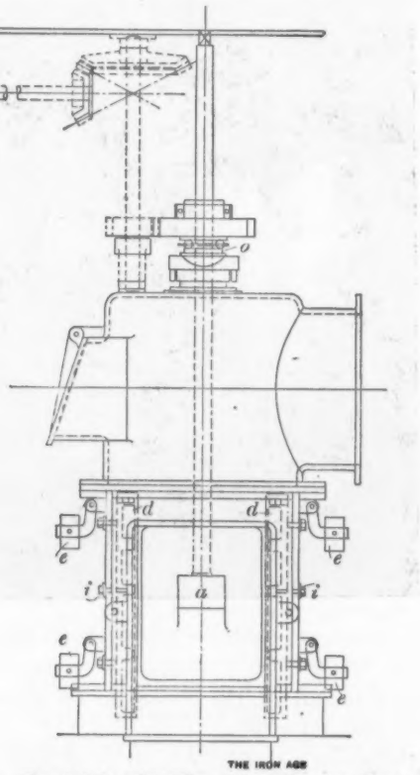


Fig. 3.—Partial Outside View, Also Showing Some Interior Working Parts.

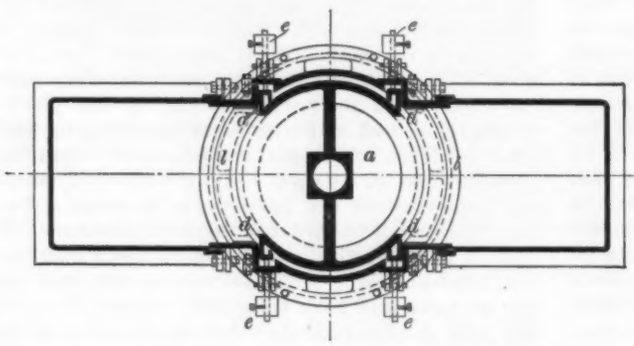


Fig. 2.—Horizontal Section, Showing Gas Connections.

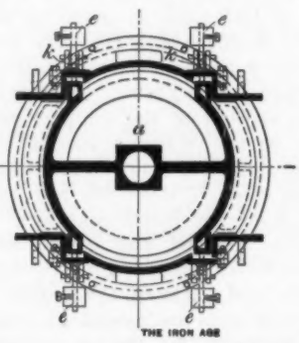


Fig. 4.—Simple Horizontal Section.

THE FISCHER GAS REVERSING VALVE.

changing the position of the valve are claimed to result in a saving of fuel up to 30 per cent. Besides these advantages, the valve requires but light repairs and is therefore very desirable.

The Fischer valve has been on the market in Germany about three years, and in that short time it has been introduced into practically every important steel plant in Germany, Austria and Italy. Some of the largest steel plants have replaced all their old valves with the Fischer valve.

Dr. Oskar Nagel, 90 Wall street, New York, holds the American rights and builds these valves in this country.

The Iron Molders' Union in 1905.

A review of the year 1905 as its developments affected the Iron Molders' Union of North America is given in the December issue of the *Iron Molders' Journal*. The article notes that in the past summer the foundry industry came into normal business conditions after the long period of slack times it had been forced to weather. "The stove and heater branch entered a period of unparalleled prosperity and it was with difficulty that the demands for stove plate molders could be supplied and the orders received for stoves and heaters filled. The jobbing and machinery branch was also favorably affected by the increased volume of trade, but not to such a marked extent."

Referring to the change in the apprenticeship ratio in Stove Founders' National Defense Association foundries from one to eight to one to five, effective June 1, 1905, the article says that the question had been in dispute since 1859. The *Journal* adds: "While many of our members were not thoroughly in harmony with the change, it is evident that further thought on the subject has convinced them of the justice and value of the agreement reached, and there is general satisfaction on the part of both parties at interest in having this dispute of long standing adjusted on a basis equally fair and equally favorable to both foundrymen and molders."

Conditions in Machinery Foundries.

It will be interesting to that important body of foundrymen, the National Founders' Association, to note the light touch on the hard places and the very sanguine tone throughout that appear in the review of events connected with the machinery foundry trade. From this portion of the article we take the following:

The jobbing and machinery branch of our trade was unfortunately affected by an organization of foundrymen whose hostile attitude toward the Iron Molders' Union has become well known since the winter of 1903. The policy adopted by the National Founders' Association at that time and put into effect during 1904 was carried into the present year, and every effort possible was made by this association to break down the strength of the Iron Molders' Union and its ability to protect its members. The foundrymen were overwhelmed with circular letters advising them to adopt the open shop policy and exaggerated statements were made in an attempt to prejudice the foundrymen against us and for the purpose of misrepresenting the true policy of our organization. To a large extent this association prevailed upon its members to refrain from entering into annual agreements with our members. It is gratifying, nevertheless, to note that the molders were not only able to maintain their minimum wage rate in spite of all opposition, but in many instances were able to secure most gratifying advances on the minimum. In fact, every minimum rate in existence in 1903 is in existence to-day, with the exception of many localities where advances on the minimum were secured. The core makers were particularly fortunate in the matter of securing higher wages and in 43 locals advances of from 15 to 50 cents a day on the minimum were granted. There was no general attempt during the year to establish a shorter work day, though in several instances the shorter work day was secured and in no instance was there any return to the ten-hour day.

The finances of the national organization are in a healthier condition than they were a year ago and the balance sheet for 1905 will prove more agreeable reading than that for the preceding year. Four large strikes commanded the attention of the membership when 1905 was ushered in—namely, those in Worcester, Mass.; Utica, N. Y.; Cincinnati, Ohio, and St. Louis, Mo.

In Worcester two of the firms adjusted their differences with the molders upon a basis of a $3 minimum and the conditions which had formerly prevailed, and the members of that city are full of confidence that they will yet win out in the other shops.

The Utica strike has been carried on with the same energy and resistance which marked its opening days, and although this strike has now been waged for more than 18 months there are good reasons for believing that it will eventually be adjusted on a basis both satisfactory and honorable to the molders' union.

The Cincinnati strike, which received the personal attention of those officers of the National Founders' Association which were stationed in that city, collapsed on their hands during the summer months and adjustments were made with all of the foundrymen except three, which gave the molders' union shops a minimum of $3 and $3.20 and the same conditions that had prevailed previous to the strike. It is interesting to note that some time after this strike had been adjusted the core makers were given an increase of 25 cents a day, advancing their minimum from $2.50 to $2.75.

The St. Louis strike is still being carried on against one of the firms. One of the others failed in business and the other adjusted the difficulty by granting the molders the same conditions as prevailed in the other foundries.

As the year came to a close 650 core makers and molders became involved in a strike in the city of Philadelphia, and this dispute commands the attention of both the foundrymen and the members of our organization at present. The issue here was one of wages. The core makers, who had been receiving a minimum of $2.50, believed they were entitled to a higher rate of wage. This having been denied them they struck with the sanction of the Executive Board.

The statement is made that financially and numerically the organization is stronger than at the close of 1904, and that while strenuous opposition from the National Founders' Association is to be expected it is believed further progress will be made in 1906.

The Steel Corporation's Profit Sharing Plan.

Chairman E. H. Gary of the United States Steel Corporation on December 15 issued the following notice:

Employees of the United States Steel Corporation and subsidiary companies will be given the opportunity to subscribe for the preferred stock of the corporation for 1906. The stock will be offered at par.

The number of shares to be allotted the employees has not as yet been determined. It is the opinion, however, of those in a position to know that it will exceed the 25,000 shares offered by the corporation at the beginning of the present year. The offer at par is a concession of several points to the employees, as the preferred stock is selling well above par. This is the fourth time the corporation has given its employees an opportunity to subscribe for stock and pay for it in monthly installments from their earnings. The first time, December, 1902, the preferred issues were placed at their disposal at $82.50 per share; the second time, January, 1904, the allotment was at $55; the third time, January, 1905, the price having advanced, the allotment was marked up to $87.50, and this year the preferred is offered at par. As each employee who holds his stock for a term of five years gets a bonus of $5 per share a year, as well as the regular dividends, it is considered an excellent investment. The employees now hold 106,502 shares.

Princess Furnace's Good Work.—Princess Furnace, located at Glen Wilton, Va., owned and operated by D. S. Cook & Son, and which has been run with remarkable success ever since first built in 1884, has been making some records during the present blast, which began September 1, this year. The nominal capacity is rated at 50 tons per day, using native ores. In the week ending October 27 the production was 365 gross tons; November 3, 381 tons; November 10, 398 tons; November 17, 389 tons; November 24, 392 tons; December 1, 389 tons, and December 8, 395 tons. All this was done on ore mined on the furnace's own property, and the make is continuing as good as any of the weeks just mentioned. The average fuel consumption per ton of iron was 2495 pounds of New River coke, and the average yield of the ore was 47 29-100 per cent., with a fluxing percentage of 36½. From November 7 to December 15, when the above information was made up, there had not been a change of a pound in the ore burden. The quality of the iron made during these seven weeks is also remarkable from the fact that not a single ton was run that graded less than No. 2 plain, the respective grades being: No. 1 foundry, 910 tons; No. 2 foundry, 1328 tons, and No. 2 plain, 471 tons. M. E. Boyer is manager.

The Smith Friction and Positive Clutch.

The combined positive and friction self oiling clutch here shown is designed for use as a clutch, a cut off coupling or a friction pulley. Its adaptabilities are almost unlimited, among which may be mentioned the connecting of dynamos, where two or more are run together, insertion in mill shafting as a cut off coupling, and the driving by belt or direct of intermittently operated machines. The clutches are furnished in various sizes to transmit from 5 to 500 horse-power, and are manufactured by Fred L. Smith, Franklin Falls, N. H. Illustrations of two forms of the clutch are given, Fig. 1 showing the type used in transmitting up to 12 horse-power and Fig. 2 the larger and more powerful sizes.

The sectional view, Fig. 2, indicates its arrangement as a cut off coupling in a line of shafting. The friction member A is keyed to one section of shafting and the friction member B to the other section. The friction ring C, which clamps members A and B together, has its friction surface at an angle of 45 degrees with the shaft, making contact on its inside with a correspondingly inclined face on the outside of member B. The member A has a perpendicular friction surface in contact with a similar face on member B, and the ring C overlaps A ¼ inch. Ring C slides freely on two dowel pins made fast in member A, the pins not being shown in the section. The heads of the clamping bolts H are connected with cams F, which are in turn connected by levers I to the sliding sleeve D. The two pins G passing through member A enter grooves in B, which have two bars across them, these not being shown. The pins G are connected through the slotted link J with levers I.

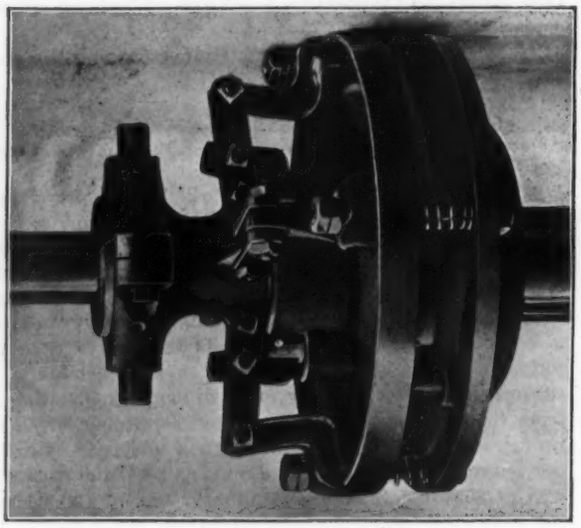


Fig. 1.—The Smith Clutch as Made in Sizes Up to 12 Horse-Power.

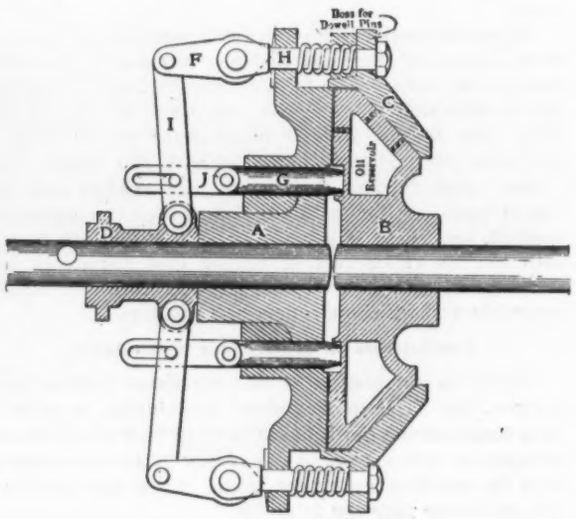


Fig. 2.—Section of the Clutch as Made in Larger Sizes.

The drawing shows the clutch with friction ring C and the positive driving pins G engaged. To release the clutch D is moved on the shaft by means of a shipper, which moves the cam surfaces F enough to allow ring C to be pressed back by the springs on the bolts H and withdraws the plugs G, the clutch members then being entirely disengaged. To engage them again D is moved toward A, which draws the friction ring C toward A through the movement of the cams, thus picking up the load gradually. When the friction has been fully engaged the positive driving pins are forced into place and the two friction members are locked. The clutch is self oiling, containing a reservoir in B from which the oil is fed by centrifugal force through porous plugs to the friction surfaces. The clutches larger than 12 inches in size —that is, those required to transmit more than 12 horse-power—have the cams and clamping bolts as in Fig. 2. The smaller sizes are like Fig. 1. The clutch may be furnished with or without the positive device. In many places this locking or positive device adds much to the value and durability of the clutch and is especially desirable where two or more machines are run together.

Ontario's Mining Law.

TORONTO, December 16, 1905.—Of considerable importance were the proceedings of the mining convention held in this city during the last three days. The business which brought representatives of mining interests together was the projected revision of the mining law of the Province. In many respects that law is out of relation with the conditions that the Legislature is supposed to provide for. New railroads have opened up new ore fields, and deposits of a kind not contemplated by the framers and amenders of the mining law have raised problems that cannot be solved to the public satisfaction by the powers embodied in the present act. Not only are recent ore discoveries forcing the hand of the Government in the matter of mining legislation, but also the backwardness of mineral development is impelling the Government to make a change. Ontario has an excellent Bureau of Mines, whose explorers have given general directions to the enterprise of prospectors. But though the prospectors have been as adventurous here as anywhere, they have too often found that the fruits of their labor are for others. As the law now stands, the discoverer of ores is entitled to a free grant of one location of 40 acres, where the deposit is not less than 10 miles from the nearest known occurrence of like mineral. This would seem a sufficient prize to tempt the prospector into areas which the geologists of the Province or the Dominion have reported as promising mineral tracts. But when prospectors go out and locate what they believe to be deposits, they take the chance of encountering a blanket claim. Somebody who had the good luck or the political favor to register a previous claim to the lot or to a tract including it would have to be disposed of first, and the prospector's application would usually decide the prior claimant to hold on to the property. Until the law is so amended as to protect the prospector against such a risk as this, he will not be the keen hunter for deposits that he would otherwise be. Because of the sluggishness of prospecting enterprise, the Province has made comparatively little headway in the development of its undoubtedly great mineral resources. Hence the greater encouragement of the prospector is one object which will be sought in the scheme of amendments the Government will present at the session of the Legislature which is expected to assemble in six weeks or possibly less.

This reference to the lack of encouragement to prospectors touches a cardinal defect of the existing mining law. There are many other grave drawbacks whose enumeration would scarcely be intelligible if not accompanied by explanations that would be too long and tedious to be presented here. In fact, the problem of mining law revision is so complicated that the Government hesitated to undertake it except with the co-operation of all the interests closely concerned in it. The present Minister

of Lands and Mines, Frank Cochrane, has a practical acquaintance with the needs of the mineral country and of the mining people. He is a Sudbury man, who has given years of study to the situation. In order to obtain the consensus of the various interests involved, he requested several months ago that meetings be held in every mining district, and that resolutions be passed embodying suggestions for mining law revision. When each locality had thus discussed the matter from its own special point of view, he desired that the collective sense of all the localities should be summed up and harmonized at a provincial convention, to be held in this city. That convention it was which was held here this week, the several delegates being the representatives of the mining districts in which meetings had been held pursuant to his request.

Among the resolutions passed and presented to the Minister of Lands and Mines were the following:

That the Department of Lands and Mines be given two Ministers, one for Crown lands and the other for mines.

That all mining partnerships be recorded in the recording office in which the mining claim is registered.

That the Ontario Government grant bounty for the production of pig iron by Ontario furnaces when made wholly from Ontario ores.

That the Dominion Government grant a bounty of $3 per ton on pig iron from domestic ore, but discontinue the bounty on the product from foreign ores.

That the Province of Ontario erect a smelter and refinery for silver-cobalt ores and provide for refining the copper and nickel ores of the Province.

That coal be admitted free of duty when used to make coke for smelting.

That the price of mining lands in the Province be uniform at $2.50 per acre in surveyed and $2 in unsurveyed territory.

Replying to the deputation which waited on him with the resolutions yesterday afternoon, the minister said he would like to see ores mined in Ontario smelted in Ontario, and that personally he was in favor of some inducement being offered by the Province to bring about that result. As to taxation, he would if he had his way raise the revenue from minerals not by an impost on the output of the mines but by a land tax. He opposed the idea of dividing his department between two ministers, as such division would in his judgment be impracticable. Inside of the next two years he predicted the iron industry of Ontario will be on a much better basis than it is to-day. As an indication of what is to be expected, he referred to the recent contract for the taking out at Moose Mountain range within the next 18 months 3000 tons of iron ore per day. He declared it to be the Government's desire to do everything possible for the mining industry.

Notes.

A sample of the first pig iron produced at the Dominion Government's experimental electric smelting works at Sault Ste. Marie has been received by Dr. Haanel, Superintendent of Mines, Ottawa. It is said to be of very fine quality. The furnace has been stopped for a day or two in order to enable representatives of the Westinghouse Company to adjust the instruments for measuring the electric current. When that is completed the furnace will be kept in continuous operation.

A 400 horse-power compressor plant is about to be shipped to the mines of the Atikokan Iron Company in the Rainy River district. It is from this mine that the ore for the company's projected furnace at Port Arthur is to be obtained. The compressor plant is being installed by the Canadian Rand Drill Company, Sherbrooke, Quebec.

Yesterday morning there was a destructive explosion at the works of the Deseronto Iron Company, Deseronto, Ont. It was caused by some unaccountable choking off of the air in the cold blast pipe. The engines and engine room were completely wrecked, and the works are closed down indefinitely for repairs. There was no loss of life.

A Canadian syndicate is said to have secured the right to use a German secret process for the treatment of cobalt ores. Ores similar in composition to those in the Cobalt area are treated in Saxony and Bohemia to their full value by a secret process held jointly by the Government and a commercial corporation. This syndicate will, it is said, operate in connection with the Royal Geographical Institute of Prussia. According to the announcement works are to be established at Cobalt costing from $1,000,000 to $1,500,000. C. A. C. J.

Americans in Paris Urge Reciprocity.

Markt & Co., Limited, Paris, importers of American hardware, are distributing in this country copies of resolutions favoring a commercial treaty of reciprocity between the United States and France which were adopted July 26, 1905, by the American Chamber of Commerce of Paris. The resolutions are as follows:

Whereas, The American Chamber of Commerce of Paris has on several occasions since 1897 adopted resolutions setting forth the advantages which would accrue to the commerce both of the United States of America and of the French Republic by the adoption of a treaty of commercial reciprocity between the two said countries; and,

Whereas, The said chamber comprises among its members business firms which deal, either as exporters or importers, in most of the important articles of commerce between the two countries; and,

Whereas, A careful and close observation of the conditions of business between the two said countries has convinced the members of this chamber that if mutual concessions were made the business between them would be facilitated and would considerably increase; and,

Whereas, The duties paid on American exports to France are in excess of duties paid on similar articles coming from other countries with which France has entered into commercial treaties;

Now therefore, The American Chamber of Commerce of Paris, in general meeting assembled, records its firm conviction that it is highly desirable, in the interest of the development of the business relations between the United States and France, and in order to enable the United States to assume the rank to which that country is entitled among the nations exporting to France, to enter into a commercial treaty of reciprocity whereby a reduction of duties shall be made on French imports into the United States, provided always adequate reductions are made by the French Republic in duties on imports into France from the United States.

Markt & Co., Limited, state that they have received from many prominent American manufacturers most encouraging letters, indicating the great interest felt regarding commercial reciprocity between the two great republics. The object aimed at is to secure for American manufacturers the minimum French rates of duty applying to British and German goods, which would certainly result in enlarging the sales of this country in the French market.

A liquid chemical compound named "zorene," discovered by a Hungarian chemist, is said to possess very remarkable properties. A piece of friable slag, after immersion in it, defied the blow of a heavy hammer. The same effect was produced on brick. Immersing substances in the compound seem to render them impervious to water, as shown by tests, in which no additional weight was observed after long soaking in water. Two pieces of steel, one of which had been soaked in the liquid, were submitted to an ammonia test equal to an exposure of five years in the air. The soaked specimen showed no effects from the ammonia, while the other was badly corroded. If these statements prove true the discovery should have considerable commercial value.

Coal shipments from Buffalo by lake during the season just closed totaled 2,783,872 tons, which is a falling off of 103,645 tons from last year's shipments, which were 2,887,517 tons. The season of 1903 still holds the record of the largest shipments in one season with 3,260,544 tons. This amount was a decided increase over the previous year 1902, when only 681,971 tons were shipped. The coal miners' strike in that year greatly affected the output of coal. The falling off for the year 1905 is partly attributed to the scarcity of railroad cars, both at the mines and up-lake ports.

The Seidel & Hastings Company, Wilmington, Del., is rolling iron plates to be used in the construction of vessels for Panama Canal traffic. The company's contract is with the Maryland Steel Company, which is building at Sparrows Point a number of vessels for the Panama Canal Commission.

THE IRON AGE

1855—1905.

New York, Thursday, December 21, 1905.

DAVID WILLIAMS COMPANY, ... PUBLISHER
CHARLES KIRCHHOFF, ... } EDITORS
GEO. W. COPE, ... }
A. I. FINDLEY, ... }
RICHARD R. WILLIAMS, ... HARDWARE EDITOR

Removal.

The New York editorial and business offices of *The Iron Age* have been removed from 232-238 William street to 14-16 Park place. Two floors of the new location are occupied, the editorial rooms being on the sixth floor and the business offices on the fifth floor.

Larger Powers for the Interstate Commerce Commission.

In studying the question of Federal control over railroad freight rates one is struck with the fact that some of the chief points which it is now desired to cover by new legislation are points which previous legislation was at the time supposed to cover. This fact should give pause to those who desire entirely fresh legislation, or at least give more countenance to the effort merely to correct and enlarge the scope of the present laws.

It was a great surprise to the Interstate Commerce Commission when the courts decided that the original "Act to Regulate Commerce," approved February 4, 1887, did not give the commission power to designate what rate of freight would be reasonable at the time it was deciding the existing rate to be unreasonable. It had been assumed that the disapproval of a rate could be regarded in the premises as continuous down to the reasonable rate; yet the courts decided that the disapproval was not continuous, but was effective only as to an actually published rate. By this interpretation the law lost very much of its presupposed value. A further great surprise came when it was decided by the courts and by the commission as well that section three could not be enforced. This section had been depended upon to give the commission power over joint rates, so that even were a through rate approved the divisions or proportions allowed the several carriers might be called in question.

There is much less danger of legislation being found ineffective if it proposes merely to correct discovered weaknesses in existing law than if it starts *ab initio*.

The annual report of the Interstate Commerce Commission presented to Congress last week gives other reasons than those above mentioned in favor of specific amendments to the existing law rather than by the enactment of an independent measure. The report cites the fact that the various interests affected have become familiar with the present law. It favors of course the bill prepared recently by the Senate Committee on Interstate Commerce. The bill gives the commission the power which it was thought at the time the original act gave it—the power to fix the future rate when declaring the existing rate unreasonable. Aside from this it extends the jurisdiction of the law somewhat as to the carriers subject to its provisions and enlarges the definition of the term "transportation" so as to include the charges for various services, as, for instance, refrigeration, now deemed beyond the commission's authority. In giving the commission the general power to fix rates power is also given by this bill to determine the divisions and incidentally to compel railroads to make joint rates. Heretofore, had the commission declared a division unreasonable, the carrier complained against could have refused to enter into a joint rate at all.

In regard to terminal roads the commission very properly states in its report, referring to excessive divisions to a terminal road owned by a shipper, that "our investigations leave no room for doubt that all these methods are at the present time more or less resorted to for the purpose or with the effect of preferring one shipper to another." The report then remarks that it has been suggested that Congress should prohibit railroads from employing any agency or using any facility in the transportation of property which is furnished by the owner of the property. The commission does not concur in this view, but holds that it should be empowered to determine whether the allowance to the property owner is a just and reasonable compensation for the services performed. In concludes, however, by saying: "Such a remedy would not be altogether adequate and any remedy is extremely difficult of application, but nothing better appears to be available."

It is hard to agree with this latter conclusion. If the commission feels that such a remedy would not be altogether adequate then it does seem that the commission has not sufficient faith in itself, and a foundation is given by the commission's own words for the strenuous opposition in some quarters to a solution of the problem by extending its powers rather than by the creation of new machinery to correct abuses.

The allowance to a terminal railroad is a division. It should be based upon the service rendered by that terminal railroad, just as in an ordinary joint rate the proportions are supposed to be determined by the proportionate services rendered by the several carriers. If the commission can determine what are the just proportions in an ordinary case of a joint rate it is impossible to see why it cannot with equal certainty determine the question when one of the parties happens to be a railroad organization owned by a shipper.

Indeed, under the present law the commission has been able to proceed against terminal railroads on the basis of unlawful preference to a shipper, where it has been wholly unable to question the divisions to independent railroads on a joint rate. Its present weapon is not taken from it by the Senate Committee bill, which simply gives it another, so that it will have two weapons against terminal railroads, compared with but one weapon against independent railroads making joint rates. It is disheartening to hear that these weapons "would not be altogether adequate."

There is further cause for doubts as to the efficiency of the commission for the work proposed. Last year it investigated the terminal railroads at Chicago and found some practices which it very roundly scored in a decision rendered November 3, 1904. In its report previous to the present one, and dated December 19, 1904, it said in regard to this and other cases:

> The important thing to which we call attention is the growth of these practices. Until recently it is our impression that they have been largely confined to a few instances. To-day they are extending in all directions and unless checked must soon become general. The commission has held that such practices are unlawful, but no effective effort has been made by the carriers, according to our information, to secure their discontinuance. All available means will be resorted to for the suppression of this species of wrongdoing, but further legislation may be needed to furnish an adequate remedy. From every point of view this matter may well command the serious attention of the Congress.

These are strange words. In *The Iron Age* of December 29, 1904, the news is given that "The Western

railroads entering Chicago, with the exception of the Wisconsin Central, have agreed, in compliance with the decision of the Interstate Commission, to refuse to extend" the excessive rebates, reducing the switching charge from a range of $10 to $20 a car to a minimum of $3.50 per car, and so on. Furthermore, it is a well-known fact that, the commission having found a division of 70 cents out of a $2.65 rate from the Connellsville region on coke to be excessive, the railroads have reduced the rate on furnace coke to $2.35, leaving the rate on foundry coke at $2.65. The action of the commission and the compliance with its finding were referred to explicitly by E. H. Gary, chairman of the United States Steel Corporation, in testimony before the Senate Committee on Interstate Commerce last summer. One would naturally expect that the present report would hasten to say that the statement in the previous report as to non-compliance with the decision was premature, but we have been unable to find a line of reference to the subject in the present report.

If the commission was really not aware of its measure of success at Chicago, a partial explanation may be afforded of its failure to carry out its promise of a year ago, that "all available means will be resorted to for the suppression of this species of wrongdoing,' as investigations similar to those carried on at Chicago could have been made at other points and with a reasonable possibility that they would be attended with some degree of success. If the statement is warranted that "further legislation may be needed," it would encourage Congress to pass that legislation on the commission's lines, if the commission showed due diligence in prosecuting the subject under its present powers.

There are arguments on both sides of the question whether proposed legislation should be on new lines or should enlarge the scope and powers of the present commission. If there were a proposition to increase the energy and activity of the commission there might not be room for much argument against it.

Higher Fuel Consumption at Blast Furnaces.

The testimony of blast furnace managers East and West is of one tenor relative to fuel consumption in recent years. It is agreed that more coke is required to the ton of pig iron produced and that the tendency in this direction has been progressive in the districts supplied with Northern coke and with Lake Superior ores. In the South the contrary case is due to a set of circumstances peculiar to that section. The crude practice of the earlier years, when ore dressing and coal washing were unknown, was attended by enormously high fuel consumption and there was but one direction for intelligent furnace operation to travel. Coal and ore mining and coke manufacture have all moved on lines converging upon improved furnace management in every particular.

In the Chicago district, the Central West and in every district in which Lake Superior ores and the cokes of Pennsylvania and the Virginias are assembled, the days of 2000 pounds of coke to the ton of pig iron are evidently over, except as the dry blast or other supplementing of ordinary blast furnace methods may bring them back. In the eighties the furnaces in the Chicago district were making remarkable fuel records on Bessemer iron, averaging in some months less than 1700 pounds, and later the Edgar Thomson group combined low fuel consumption and high outputs in a way that attracted attention on both sides of the water. Furnacemen throughout the country were spurred by these exceptional performances to reduce their fuel costs, particularly if the distance of their plants from the coke regions was considerable. Higher efficiency of hot blast stoves was especially studied at the same time, and with the high iron content of Lake Superior ores Central Western furnaces brought their practice to a basis on which a net ton of Connellsville coke to a gross ton of iron was common practice in the nineties, while frequently, where a special study was made of fuel economy, the coke burden was reduced by 100 to 150 tons below the net ton. To-day the furnaces of the Central West are using 2200 to 2300 pounds of coke to the ton of iron, representing an increase of 250 to 400 pounds of fuel in the past eight or ten years.

The change has been due in part to the lowering of the iron content of lake ores, in part to the large use of the fine Mesaba ores with their generally high moisture content—these ores constituting nearly 3 out of every 5 tons of lake ores shipped this year—while a further cause is to be found no doubt in the lower average of fixed carbon and in some cases higher sulphur also in the coke. It is with high grade coking coal as with high grade ores—the supply is not an unlimited one and it is not the policy of the producer to take out the best from his mines each year, since that would mean eventually that the poorer grades would be the sole supply.

But it is not in the character of raw materials alone that explanations are to be found for the increase in fuel consumption that has added to the blast furnaceman's anxieties in the past few years. Mechanical factors are to be considered also. To raise nearly 2000 tons of material to the top of a modern furnace every 24 hours and deposit it in place has imposed a heavy task on the automatic skip hoist. Inability to distribute the stock so as to prevent hot spots, channeling and other results of the operation of gas currents has brought with automatic filling a train of troubles not yet satisfactorily overcome. The consequent slips and irregular working have been no small factors in running up the fuel bill.

In the line of corrective measures the extension of the use of the dry blast system promises to have increasing attention now that the United States Steel Corporation has decided to install the Gayley method at the furnaces it will build at the Carrie, Duquesne and Chicago district plants. Continued operation under this system has not only confirmed earlier results as to the lowering of fuel consumption but has shown a much closer approach of the actual iron yield of ores to the theoretical yield than has been attained in ordinary practice. Regularity of working and a minimum of slips have reduced the usual flue dust loss on Mesaba ores from 4 and 5 per cent. to a little over 2 per cent.

The keeping down of the sulphur content of coke through the mixing of coals, possible under the by-product process, is another matter that will doubtless be studied in seeking for lower fuel costs. Experience with retort coke has been so satisfactory in respect to fuel consumption that a steady increase in its use is to be expected. Finally, the perfection of top filling apparatus is a field in which engineers have still excellent opportunity to aid the furnaceman in his struggle for lower fuel consumption.

Machine Shops and Automobiles.

Automobile owners are becoming good customers of established machine shops, preferring them to the garages. It is not unusual to find an automobile in the shop of a machine tool manufacturer or engine builder or maker of other lines of machinery, but the general machine shop which makes a specialty of repair work is more generally

sought. Owners of garages made a mistake in beginning their business by employing inefficient workmen and charging too much for work done. This evil is being remedied in many instances. Others who make a business of selling and repairing automobiles did not make the mistake in the beginning. The first-rate general machine shop has a wide variety of work to do and must have first-class men to do it. The requisite machinery is at hand. Enterprising owners of these establishments are studying the mechanism of automobiles and putting themselves in position to direct intelligently any work that may be required. The automobile of to-day is a complicated affair. None but high class workmen should be intrusted with its maintenance and repair or the work will be poorly done, and poor workmanship may mean disaster to the owner. The machine shop usually has fixed rates for work done, which are not extortionate. Consequently they are building up a new line of customers who should become a very satisfactory source of income.

Steam Turbines in Tropical Waters.

A Calcutta correspondent of one of the English engineering papers makes the statement that the high temperature of the waters of tropical seas is an obstacle to the success of the steam turbine in ships which must traverse these waters, especially war ships, in which speed and coal consumption are very important factors. He argues that where the temperature of the ocean is 90 degrees or higher serious results must occur by the reducing of the vacuum to a point below that required in economical condensing. This contention is not well founded, nor is it especially important except that it illustrates a misconception with regard to large steam turbine units, such as are installed in the new Carmania and which are proposed as motive power for war ships of large tonnage in this and other countries. Engineers who have had to do with the condensing plants of turbines emphatically state that it is possible to procure a satisfactory vacuum in a marine turbine installation with 90 degrees water temperature. The large ships of this class maintain a vacuum of 28 inches in the North Atlantic. A tropical water temperature might reduce this to 25 inches, and it might be necessary to speed up the pumps to produce a more rapid circulation of water. But it is also true that where compound reciprocating engines are employed it is just as necessary to use condensers, and their usual vacuum of about 26 inches is in the same way affected by the heat of the ocean water.

If the criticism were well based the condition stated would be a serious menace to the future of turbine propelled battle ships. The correspondent, accepting the necessity of a high vacuum as an admitted fact and taking the new turbine propelled British battle ship Dreadnought as his example, asks the question, "How is she to maintain speed and what will the coal consumption be in the Red Sea, where the temperature of the water is from 90 to 96 degrees F.? At such a temperature how is 90 per cent. vacuum to be obtained? The turbines require not less than 50 times the weight of steam in circulating water in the North Atlantic and very much larger condensing plants must be employed in the tropics. Is it possible to get a 90 per cent. vacuum with water at 90 degrees, the usual vacuum being 25 inches in steamships?" The correspondent goes on to predict that "the Dreadnought, with its proposed speed of 21 knots, would not be able to overtake a 17 knot P. & O. liner which had got an hour's start of her from Suez to Aden." The firemen would not be able to stand up to the work even if the boilers would stand the forcing and the coal supply hold out, he argues. Fortunately for the future of the turbine propelled ships, the critic has left out of consideration the known efficiency of condensing plants on large ships and the fact that their tremendous turbines are very much more economical proportionately than the small marine engines of the same type which have been tried and, according to report, have not been found entirely satisfactory in tropical waters.

A much more important problem is how marine turbine cylinders may be covered to prevent the tremendous radiation of heat, especially from the high pressure cylinder. As the new turbine war ships have been designed the engineer officers have to stand while on duty on a grated platform directly over the cylinders, making the heat almost unbearable, while in ships propelled by reciprocating engines the officers are below and away from the high pressure cylinder and suffer much less in consequence. This matter of covering the turbine cylinders will have to be given careful attention in the near future.

CORRESPONDENCE.

Substitution in Government Awards.

To the Editor: Some time ago I called your attention to a practice prevalent in some of the departments of the Navy of substituting because of a lower price some other article than that asked for, to the detriment of the service and to the expense of the Government and therefore of the people.

A glaring instance has just come to my notice which not only illustrates the practice but casts unjust reflection on the officer at the navy yard who has taken his time to ascertain the wants of his department, the merits of the several kinds offered for sale and the necessary approval of the chief of the department, to make the purchase of the particular article wanted. The instance in question is the purchase of a large number of spur geared combination chucks covered by Requisition 50, Schedule 208, Class 133, for the Steam Engineering Department of the Charlestown Navy Yard. This instance will also illustrate the difficulty which continually confronts the officers in charge of the several departments at the navy yard and at the same time will furnish the reason why more and better service is not received for the money expended. The state of affairs may reasonably be expected to continue as long as the system now in vogue continues. To appreciate this incident, let me call your attention to "what happened."

Explicit specifications were published as usual, which had received all the necessary official approvals from the chief of the department down. Manufacturers and dealers were asked to bid on spur geared chucks of definite sizes, with face plates semi-finished to particular dimensions. Some bidders undoubtedly bid upon what was asked for; others supplied bids on some other kind, similar but at less price. The award has been made to the lowest bidder, on something other than that asked for or wanted. Those who inquire of the department concerning the award of this contract are informed that "the bureau waives that part of the specifications which refer to 'spur geared'" and that the award was made to Messrs. So and So, who were the lowest bidders on what-was-not-asked-for.

This practice lines up the bidders to a guessing match as to who can name what "something-different" will slip through at a less price by "waiving that part of the specifications which refers to 'spur geared.'" It is not much different from the game of under-which-shell-will-the-pea-be-found. And all this, after the chief of the department has approved the purchase in the first place of a particular type of chuck. The conclusion forced must be that all the official approval obtained beforehand, which takes unlimited time and departmental labor, is of no value, or else that some one other than the chief who originally approves—one who is not responsible for the

results in the yard—deliberately controverts the original intention.

It is not a part of this discussion whether in the judgment of somebody one type of combination chuck is better than another type of combination chuck, nor whether the difference in the price amounts to enough to make it worth a discussion, as the highest price for what was wanted was but $153 more than the lowest price on what was not wanted, on a purchase of nearly $1000.

It is, however, of great importance to the service whether the ability of the officer in charge of the department, where results are continually looked for by Congress, is to be called to question and his wants willfully set aside after receiving the highest approval of the department and tools or anything else be purchased for his department's use contrary to what in his opinion is wanted for his success, that he is held responsible for.

I trust that you will pardon me for again bringing this matter to your attention, but I feel that it is of real importance to the interests of the Government and that I am voicing the opinion, not only of the naval officers who bear the brunt of these substitutions, but also of every one who has business dealings with the Navy Department. ENGINEER.

BOSTON, December 16, 1905.

Lake Iron Ore Matters.

DULUTH, MINN., December 16, 1905.—Furnacemen and miners are alike astonished at the speed with which the Old Range ores have been taken for the coming year. Practically everything that was for sale on the Gogebic, Marquette and Menominee ranges, all Old Range ores in fact, has been taken up. With this the buying has been in less volume than in previous years, as there are fewer of these ores to be had. The sale of the Sellwood mines to consumers has been severely felt by buyers and the congestion is growing apace. It is true not only of these mines but of others that have passed into the hands of larger or smaller consumers. There has been large buying, too, of the salable Mesabas, meaning by salable not those that are of high grade but those that can be bought, the position of buyers and sellers having reversed itself in the past few years. There remains, to be sure, a large tonnage of fair and good Mesaba ores that has not been placed, but the buying continues and it is safe to say that the close of 1905 will see everything in the shape of iron ore that miners wish to sell placed with consumers. With a good or even an average year for 1906 it is undoubtedly true that shipments will be considerably in excess of what sellers dare now to place, and it is especially fortunate that the buying movement of the year takes place so early, when it will be possible for miners to improve their conditions and to accelerate betterments, with the view of mining on a larger scale than was anticipated.

The Oliver Iron Mining Company is taking up the problem of washing its western Mesaba ores and a plant for the purpose is to be built very soon. A works is to be erected at the Canisteo mine at Bovey, where development is now under way with three shafts in the ore body. This property will be a great shipper when conditions permit and the experiments in the way of washing these ores will be watched with interest. While styled experiments, the company has a very definite idea of just what it is doing, and it is known in a general way that the washing problem is not so serious a one. This company has just secured title to a half interest in the Walker lands on the west Mesaba, in the vicinity of Bovey and Holman, where its developments are in progress. Some time ago a half interest in these lands was bought by the Great Northern Railroad for about $100,000, but it is learned that the price paid now for the remaining half is considerably higher. It is known that these tracts, which extend for several miles along the ore bearing formation, contain a very large tonnage of the characteristic ores of that district. Few realize the importance of these Western developments and what they mean to the large interests that have now secured control of the whole region west of the Nashwauk group to the Mississippi River. Indeed the Oliver Company is exploring west of the river and is finding some ore at points several miles from it. These are extensions of the Mesaba that had not been looked for and make altogether uncertain the precise point at which exploration will cease to be productive.

At the old Caspian mine, near Stambaugh, Menominee range, Pickands, Mather & Co. have already found a large mine and the indications are that it will equal any on the western Menominee. Explorations were commenced there eight years ago by diamond drill and ore was soon cut, but by reason of other finds that were sufficient for immediate operations it was permitted to remain idle till a short time ago, when a shaft was driven through 90 feet of quicksand to the ledge. For the next two years iron market conditions prevented work, but last spring the shaft was unwatered and drifting was resumed with excellent results. A lens of ore 400 feet in width and more than 700 feet long has been opened into one level and exploration to prove its greater extent is in progress.

The Cleveland Cliffs Iron Company has given orders this week for two underground electric haulage systems, one for the Cleveland Lake on the Marquette and the other for the new Crosby mine of the west Mesaba range. The latter is now being opened for mining on a considerable scale and its proposed plant is to be 100 horse-power, permitting a large product. The mine is lean ore but of good physical character and can be mined at little cost. It will be stripped and work has begun. Both equipment plants are to be furnished by the General Electric Company. D. E. W.

The Tennessee Coal, Iron & Railroad Company's New Directors.

On December 19 John W. Gates, C. S. Guthrie, L. C. Hanna, E. W. Oglebay, Grant B. Schley, S. G. Cooper, E. J. Berwind and Oakleigh Thorne were elected directors of the Tennessee Coal, Iron & Railroad Company. The Executive Committee is now made up as follows: John W. Gates, C. S. Guthrie, Grant B. Schley, L. C. Hanna, E. W. Oglebay, D. H. Bacon and S. L. Schoonmaker. The retiring directors were James T. Woodward, John E. Borne, Benjamin F. Tracy, C. Meyer, J. H. Smith, Andrew W. Smith, H. S. Leroy, A. B. Boardman and William Barbour.

This action shows that the control of the company has passed into the hands of men identified with the Republic Iron & Steel Company, as was intimated in these columns last week. Since the contest for control started a month ago the price of the stock has advanced over 50 points. After the meeting C. S. Guthrie, the new chairman of the Board of Directors, gave out the following statement:

"The new interests entering the board of the Tennessee Coal, Iron & Railroad Company are in absolute control of the property. We have bought control of the corporation with the object of developing it and bringing the property up to the highest degree of efficiency. Considerable money will be spent for extensions, improvements, &c. As to the merger of the Tennessee Company with the Republic Iron & Steel Company, that is a question of the future."

Recent dispatches from Toledo, Ohio, have stated that the Cleveland Cliffs Iron Company of Cleveland is preparing to build blast furnaces and a steel plant, with wire and sheet mills, on the property it acquired at Toledo a year or two ago. We are advised by the company that these reports are without a semblance of foundation and that it has no such plans under consideration.

The Brooklyn Bank, Brooklyn, N. Y., has issued the initial number of a series of illustrated *brochures* entitled "Interesting Bits of History," dealing with events and incidents which will have great interest and value. The first issue gives a number of historical facts in connection with Brooklyn and Long Island. Clinton Fulton is the author

By-Product Coke in the Blast Furnace.

BY "FURNACEMAN."

The value of coke depends, first, upon physical structure and strength and, second, upon chemical analysis. The standard metallurgical fuel of the United States is undoubtedly Connellsville bee-hive coke but that even the standard can be improved is shown by what is detailed below. The record month's output of a certain blast furnace using a mixture of bee-hive and by-product coke was 6230 gross tons. The average output for a number of months was 5700 tons. The output of iron, using all bee-hive coke, was slightly less than when a mixture of bee-hive and by-product coke was used. Using practically the same ore mixture and making a better grade of iron the output for over two months in which by-product coke was used exclusively was a trifle over 7200 tons per month. The Connellsville coal used in making both the bee-hive and the by-product coke was from the same mine and from the same locality in the mine. As the by-product oven yielded 10 per cent. more coke than the bee-hive oven, the ash in the by-product coke was lower, but this will not account for the 10 per cent. lower coke consumption and 16 per cent. increased output of furnace.

In making the 6230-ton output the furnace was pushed to its limit and made 10 per cent. white iron, the rest being No. 3 iron, while during the run on by-product coke 12 per cent. of the output was foundry iron and less than 1 per cent. was below No. 3 grade. The aim at all times was to give the furnace all the wind it would take, but during the use of by-product coke the furnace did not receive the wind it would have taken on account of insufficient blowing capacity.

Economies of By-Product Coke.

The above is probably as good a showing for by-product coke as has ever been made but is no better than the average should be when equal pains are taken with both bee-hive and by-product coke and using the same coal. Neglecting the revenue from the sale of tar and ammonia from a by-product plant, which depends upon the amount of volatile matter in the coal, the larger yield of coke per ton of coal and the four to six tons output per oven per day will justify the building of by-product coke ovens to-day in place of bee-hive ovens, especially when in addition to the above it is possible to convert the coal into coke and put this coke on cars for less money per ton than the cost of drawing the coke from the bee-hive oven.

A very large tonnage of coal which to-day can only be sold for steam coal, as it cannot be coked in bee-hive ovens, can by grinding and stamping be converted into a very good coke in the by-product type of oven. The mixing of a very small percentage of a first-class bee-hive coking coal with coal that cannot be successfully coked in a bee-hive oven and then stamping the mixture, will give, in the by-product oven, a coke equal to the best bee-hive coke.

The value of coke from a sulphur and ash standpoint seems to have had very little consideration. With the same ore mixture the lower the sulphur in the coke the less basic cinder can be used to make the same grade of iron, and as it takes fuel to melt cinder the less cinder made the lower the fuel consumption will be per ton of iron. For instance, suppose the ore mixture used cost 8 cents per unit metallic iron, limestone $1 per ton, coke $4 per ton; suppose the ore to contain iron 60 per cent, silica 9 per cent., alumina 2 per cent., moisture 4 per cent., while the coke contains sulphur 0.60 per cent. and ash 10 per cent., of which 50 per cent. is silica and 50 per cent. alumina; making low silicon iron, fuel consumption is 2000 pounds of coke per ton of iron. Making 1200 pounds of slag, we should have a cinder containing only 1 per cent. sulphur. All the iron made on such a mixture would contain less than 0.03 per cent. sulphur. The result of trying to get such ideal conditions with coke containing 1.2 per cent. sulphur would be the doubling of the volume of slag, which would increase the fuel consumption, and the final result would be the making of 3120 pounds slag at a cost as follows:

1,640 pounds coke to make 1 ton of iron } 936 pounds of coke to melt 3,420 pounds of slag }	$5.20
3,120 pounds limestone	1.56
100 units iron	8.00
Total	$14.76

Against this, iron made with low sulphur coke would cost $12.60 for materials, or a difference of $2.16 per ton of iron. With the judicious (or injudicious) use of lime many furnacemen to-day carry as high as 2½ per cent. sulphur in the slag, but this is done at the expense of fuel, danger of scaffolding and the making of a large percentage of off iron (high sulphur), and output is cut down.

Suppose we had a coke of the same analysis as charcoal and costing $4 per ton, the cost of iron would then be:

1,800 pounds (charcoal) coke	$3.60
225 pounds stone	.11
100 units ore	8.00
Total	$11.71

The best furnace practice to-day limits the sulphur contents of the slag to 1¾ per cent. Under these circumstances an ore could be used containing 66 per cent. iron, 2 per cent. gangue and 4 per cent. moisture, and a coke containing 3 per cent. ash and 0.6 per cent. sulphur. Provided the silica and alumina ratio was correct, the cost of iron with the above mixture is as follows:

1,900 pounds coke at $4 per ton	$3.80
100 units ore at 8 cents	8.00
1,140 pounds stone at $1 per ton	.57
Total	$12.37

Importance of Low Sulphur Fuel.

The above figures show what an important part the small percentage of sulphur plays in the blast furnace, dealing with theoretical conditions. The following considers the same subject from every day (practical) conditions. In every case labor is excluded, as that depends entirely upon the amount of money expended at the furnace to equip it with labor saving devices:

Given ores costing 8 cents per unit metallic iron.
Coke costing $4 per ton.
Stone costing $1 per ton.
Coke (A) containing 10 per cent. ash, 0.6 per cent. sulphur.
Coke (B) containing 10 per cent. ash, 1 per cent. sulphur.
Coke (C) containing 10 per cent. ash, 1.25 per cent. sulphur.
Coke (D) containing 10 per cent. ash, 1.50 per cent. sulphur.
The sulphur in all cases to be less than 1¾ per cent. in the resulting slag.

A.—2,000 pounds coke	$4.00
100 units ore	8.00
1,200 pounds stone	.60
Total	$12.60

Slag contains 1 per cent. sulphur and all iron will be merchantable, with no high sulphur.

B.—Cost would be the same as above but sulphur in the slag would be at the limit and a percentage of casts would be low grade and high sulphur.

C.—1,600 pounds stone	$0.80
2,200 pounds coke	4.40
100 units ore at 8 cents	8.00
Total	$13.20
D.—2,060 pounds stone	$1.03
2,400 pounds coke	4.80
100 units ore	8.00
Total	$13.83

The above shows what a decided factor sulphur is in the cost of pig iron. The by-product coke oven is here to stay, and when it is adopted and the coal is properly washed to free it of sulphur and ash the 600-ton furnace will be more common than is the 500-ton furnace to-day, and better iron and consequently better steel will be made.

The State and National banks of Kansas now have total deposits of $119,000,000, an increase of $1,500,000 since September. The average deposit per capita for the entire State is over $79. Only a few years ago the farmers of Kansas were heavy borrowers of Eastern money, but they have since enjoyed remarkable prosperity.

Officials of the alleged Chicago Brick Trust pleaded guilty December 18 and were fined $2000 each for conspiracy and violation of the State antitrust laws.

The Interstate Commerce Commission's Report.

The nineteenth annual report of the Interstate Commerce Commission was transmitted to Congress on December 14. Following out the urgings of previous reports for the delegation of more authority to the commission, this year's report presents as an appendix a bill submitted by the commission to the Senate Committee on Interstate Commerce, at the latter's request. The principal amendment contained in the bill is the delegation of authority to the commission to determine what rate should be substituted for one found after full hearing to be unlawful; and there is the further provision that the order of the commission prescribing such substituted rate shall take effect within a reasonable time, unless vacated or set aside by judicial proceedings. It is designed in the amendment proposed by the commission to confer this authority in unmistakable terms and in conformity with the decisions of the Supreme Court and the opinion of the Attorney-General furnished to the committee respecting the power of the courts and the constitutionality of such legislation.

The commission recommends that the phrase "under common control, management, or arrangement," in the first section of the law, be omitted. This would make the regulating statute apply to certain classes of carriers now exempt from its application and requirements. The definition in the first section of the term "transportation" should be enlarged so as to include the charges for various services, such as refrigeration and the like, which are now claimed to be beyond the authority of the commission. The obligation to furnish and provide the services here referred to is also proposed, which is likewise a point now in dispute.

Refrigeration Charges.

While some railroad companies furnish refrigeration themselves, in most cases it is furnished by independent companies, which usually provide the car, for which the railway pays, and the ice, for which a charge is made against the shipper. To-day this business has fallen into the hands of two or three companies, of which the Armour car lines is the principal. Extended investigations by the commission have led to the conclusion that the charges imposed are in some cases at least exorbitant and that the charges are not uniformly exacted.

The commission has held that the furnishing of refrigeration is a part of the transportation itself, and that the railway is obliged under the present law to publish and maintain its charge for icing; but the railways confidently insist that providing refrigeration is a local service, which is not and cannot be put under the supervision of any Government tribunal, and that even if Congress might impose upon the carrier the duty of furnishing this service it has not done so; that it is furnished by private persons and not therefore subject to the jurisdiction of the commission. It is not recommended at this time that the carriers should be prohibited from using private cars or from employing the owners of such cars to perform the icing service if they find that course to their advantage, but the commission does recommend that these charges should be put on the same basis as all other freight charges, so far as they can be.

Export Rates, Through Rates and Joint Rates.

The commission has urged heretofore the publication and maintenance of export rates. However, as it has been earnestly insisted that the enforcement of this rule would seriously interfere with our foreign business, especially in the handling of cotton through Southern ports and of certain imports and exports through Pacific Coast ports, the commission decided to suspend action until Congress had opportunity to consider and act upon the subject. The commission proposes therefore that the sixth section be so modified as to plainly include this species of traffic, but that the commission be given power to suspend and modify the requirement in this respect whenever that may seem necessary in the public interest.

The commission observes that, while the third section of the act to regulate commerce attempts to secure the interchange of traffic by connecting railways and to prevent unjust discrimination by any carrier between its different connections, it has been held, both by the courts and the commission, that this part of the third section is not enforceable, because no means are provided for determining the conditions upon which traffic shall be interchanged and the proportion of the through rate which shall be received by the several carriers. It follows that connecting carriers are now under no legal obligation to establish through routes or joint rates and may at their pleasure withdraw from such arrangements when they have been actually entered into. When it is considered that a large part of the most important rates of this country are joint rates it will be seen that the railways have it in their discretion by this means to largely defeat the purpose of the law, and that in order to prevent this the commission should have authority to order railways to continue through routes and joint rates which are in effect and to prescribe the divisions which the several carriers shall receive in the distribution of those rates, in case the carriers fail to agree upon such divisions. It is also pointed out that discriminations against individuals and against particular species of traffic can be effected by the refusal of a carrier to establish a joint rate upon given commodities.

Terminal Roads and Private Cars.

There is an important class of cases in which the owner of the property performs a part of the transportation service, and where the carrier by paying such owner an extravagant sum for the service rendered thereby prefers him to other shippers of like property. This may happen in any case where the shipper is the owner of any of the facilities of transportation or performs any part of the transfer service. Such preferences may take the form of an excessive division to a terminal road owned by the shipper, the payment of an excessive elevator charge to the owner of the grain, or the payment of excessive mileage upon the private car which conveys the property of the owner of the car. Investigations made by the commission leave no room for doubt that all these methods are at the present time more or less resorted to for the purpose or with the effect of preferring one shipper to another. The commission should be empowered in a case of this kind to determine whether the allowance to the property owner is a just and reasonable compensation for the service rendered and to fix a limit which shall not be exceeded in the payment made therefor. Such a remedy would not be altogether adequate, and any remedy is extremely difficult of application, but nothing better appears to be available.

Examination of Books.

An efficient means of discovering illegal practices would be found in authority to prescribe the form in which books of accounts shall be kept by railways, with the right on the part of the commission to examine such books at any and all times through expert accountants. Probably no one thing would go further than this toward the detection and punishment of rebates and kindred wrongdoing. The Supreme Court has held that the Federal courts have no power to compel the making of these returns by mandamus, and the act itself imposes no penalty of consequence for failure to make the returns. The proposed bill provides a suitable penalty for unreasonable failure to make these returns and that the Federal courts shall have statutory authority to act by mandamus.

Rebates and the Elkins Law.

In the annual report for 1903 the commission endeavored to explain the changes in the regulating statute effected by the Elkins law, which was approved in the previous February and made some favorable comments upon its operation, and a similar opinion was expressed in the report made a year ago. Further experience, however, compels the commission to modify in some degree the hopeful expectations then entertained. Not only have various devices for evading the law been brought into use but the actual payment of rebates as such has been here and there resumed. Instances of this kind have been established by convincing proof on which prosecutions have been commenced and are now pending. More frequently the unjust preference is brought about by methods

which may escape the penalties of the law but which plainly operate to defeat its purpose.

Statistics of Railways.

One of the publications annually issued by the commission is a brief report on the income accounts of operating roads, which is intended to show, at the earliest practicable date, the principal items included in railway income accounts. The preliminary report for the past fiscal year includes returns for 752 companies, representing an operated mileage of 214,477.82 miles, which is presumably about 99 per cent. of the mileage that will subsequently be covered by returns in the final report for the same year. The gross earnings of the railways for the year ending June 30, 1905, on the mileage just stated were $2,073,177,325. This total comprised earnings from the passenger service, $572,109,366; earnings from the freight service, $1,449,182,702, and miscellaneous earnings, $51,885,257.

According to this preliminary report, the gross earnings from operation averaged $9666 per mile of line. This average is considerably higher than the like average for any other year for which a statistical report has been published by the commission. The final report for the year ending June 30, 1904, showed that the total gross earnings of the railways on 212,243.20 miles of line for that year were $1,975,174,091, being equivalent to $9306 per mile. Of the gross earnings per mile of line, the passenger service contributed $2667 and the freight service $6757. The operating expenses of the railways embraced in the current preliminary report amounted to $1,383,584,404, thus averaging $6451 per mile of line. For the year ending June 30, 1904, the operating expenses reported finally were $1,338,896,253, or $6308 per mile. This advance report gives the ratio of operating expenses to earnings as 66.74 per cent. The final report for the year 1904 gave 67.79 per cent. The preliminary report shows that the net earnings of essentially the same roads were, for the year ending June 30, 1905, $689,592,921, and for the year ending June 30, 1904, $634,674,561.

The railway companies for which returns are included in this advance report also received $114,636,642 in the form of income from investments in the stocks and bonds of railway and other corporations and from other miscellaneous sources. The net earnings increased by this sum give a total income of $804,229,563. The aggregate deductions chargeable against this income were $713,994,800.

Safety Appliances and Accidents.

Within the past year decided improvement has taken place in the condition of safety appliances on all roads subject to the provisions of the statute, and at no time since the safety appliance law became effective have the results of its operation been so satisfactory as at present. The practice with regard to safety appliances is now substantially uniform throughout the country. There is a noticeable tendency toward uniformity in couplers and uncoupling attachments and an increase in their strength, decreasing the number of defects.

Grab irons are receiving much better attention than formerly, and it is now the exception to find cars unequipped with this important safety device. Still steps, ladders and roof hand holds when defective introduce a great element of danger, and these appliances should be covered by the statute. The great progress in the use of air brakes has been accompanied by marked deterioration in the condition of hand brakes, the uses of which in times of emergency are mentioned. There is still room for improvement in the maintenance of the retaining valves of air brakes.

Returns made to the commission show that on October 1, 1905, out of a total of 1,790,113 freight cars 1,564,396 were equipped with air brakes. About 111,122 private cars are also practically all equipped with this appliance. The commission ordered during the present year, after hearing, that on and after August 1, 1906, a minimum of 75 per cent. of the cars in all trains required to be operated by power brakes must have their brakes used and operated. This is in lieu of the present lawful minimum of 50 per cent.

The hours of labor on railroads is another topic discussed in the report, and the commission says that the need of a high standard of physical and mental condition for certain classes of employees and care on the part of supervisory officers to see that proper regulations are maintained and obeyed is quite generally recognized, and a considerable number of railroads have prescribed rules limiting the number of hours of work and providing rest periods, but these rules appear to have been poorly enforced.

Western Railroads Decide to Obey Laws.

Very interesting news comes from Chicago, indicating that railroad companies will hereafter avoid the practices which have brought upon them the menace of drastic legislation. At a meeting of the executive officials of all Western railroad companies, held in that city December 19, a remarkable agreement was entered into with a view to compelling a strict adherence to the provisions of the Interstate Commerce and Elkins laws. Every company binds itself to inform the Interstate Commerce Commission of any acts which shall hereafter be committed by any other company in violation of the law.

For the purpose of keeping in close touch with the situation it was agreed that a committee should be appointed whose members shall represent the various Western freight associations and whose duty it shall be to canvass the situation from time to time and to report any and all violations of the law. Should any be reported it will be the duty of this committee to inform the Interstate Commerce Commission of the fact and to furnish that body all evidence possible in the event of an investigation. The associations which will designate members are the Transcontinental Freight Bureau, the Western Trunk Line Committee, the Transmissouri Freight Rate Committee, the Southwestern Rate Committee and the Texas Lines.

It was the general opinion that since the penitentiary clause had been abrogated and a fine against the railroad violating the law had been substituted railroad men should no longer feel any delicacy in informing regarding infractions of the law. In this way it is expected to stop the payment of rebates and all devices for giving preferences to shippers.

Labor Notes.

The Louisiana Supreme Court rendered a decision this week to the effect that a labor union has no right to control the acts of its members when they are performing public duties. Two members of the New Orleans Plumbers' Union who had been appointed examiners of applicants for plumbers' licenses were ordered by their union to vote for a certain candidate for the office of Inspector of Plumbers. They refused to comply and were expelled from the union and boycotted. The Supreme Court orders the plumbers' union to reinstate the plaintiffs, to abandon all boycotts and to pay them the full amount of damages they suffered from its action.

Another decision of the Louisiana Supreme Court affects the Cotton Screwmen's Union. A member of the union sued a contractor for damages on account of injuries received while loading cotton on a steamer. The court held that when a labor union insists on controlling the selection of foremen and refuses to accept men placed on the levee by the contractor the men working under him cannot recover damages in case of accident.

The Metal Lathers' Union, at one time a branch of the Housesmiths' and Bridgemen's Union, New York, has just made a trade agreement for two years with the Employing Metallic Furring and Lathing Association of New York. The present wages of 65¼ cents an hour will be continued. When the last lockout of the housesmiths took place the Metal Lathers' Union was reorganized under the arbitration agreement with the employers. This was the first step in a revolt of several other trades against the Housesmiths' and Bridgemen's Union.

NEWS OF THE WORKS.

Iron and Steel.

A large shipment of steel rails is being made from the Ohio Works of the Carnegie Steel Company, at Youngstown, Ohio, to Indian Territory. This plant is also making heavy shipments of tin bars to tin plate mills of the American Sheet & Tin Plate Company in the Pittsburgh district.

No. 2 puddling plant at the Lower Union mills of the Carnegie Steel Company, at Youngstown, Ohio, has been dismantled and the equipment will be scrapped. The site formerly occupied by this mill will probably be utilized for the building of new works.

Anna Furnace of the Struthers Furnace Company, at Struthers, Ohio, which had an accident in October, has been repaired and put in blast. The cement department at this plant is closed down while extensive repairs are being made.

Falls hollow staybolt iron manufactured by the Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, has been specified for a number of locomotives recently ordered from the Baldwin Locomotive Works, Philadelphia, by the Seoul-Fusan Railroad, Korea.

The Central Iron & Steel Company's mills at Harrisburg, Pa., will close a record breaking year. The mills have gone ahead of all previous production of plates and have turned out a large quantity of Government work.

Sheridan Furnace, operated by the Berkshire Iron Works at Sheridan, Pa., will be started within a short time, as repairs are now being completed.

General Machinery.

J. E. Rilling & Co., Milwaukee, Wis., will be in the market about the first of the year for a drum sander.

The Pittsburgh Industrial Iron Works, Westinghouse Building, Pittsburgh, which recently took over the plant of the American Production Company, Reynoldsville, Pa., has put the plant in operation and is designing contractors' and rolling mill machinery. At present the foundry is running about five tons of iron per day and turning out considerable machine and boiler shop work, while the brass foundry is casting every other day.

The Fawcus Machine Company, Pittsburgh, makers of cut gears, will increase its capacity by the erection of an additional building, 30 x 110 feet, and the enlarging of its machine, erecting shops and offices.

The Prince Edward Island Railway Company, Charlottetown, P. E. I., has not yet prepared plans for rebuilding its shops which were recently destroyed by fire. The company is now utilizing other buildings as temporary quarters to work in during the winter and has secured all the machinery it needs for immediate requirements. A large portion of the plant has been started up and is in good working order.

The Robins Conveying Belt Company, New York, has recently secured a large order for a series of conveyors for ore bedding purposes for the Garfield plant of the American Smelting & Refining Company. Among other orders now on hand is one from the Western Engineering & Construction Company, San Francisco, Cal., for a 34-inch conveyor to be installed on a gold dredge in the Oroville district. This conveyor will be equipped with the Robins new style five-pulley troughing idlers. The Robins Company has also received an order from the Pittsburgh Reduction Company for a belt conveyor intended for its East St. Louis works.

Most of the machinery, including engine and boiler, was not seriously damaged in the recent fire at the plant of the A. C. Thompson Company, Limited, general machinists, Lunenburg, Nova Scotia, and about the only tools it will have to purchase will be in the way of wood working machinery, such as planers, saw tables, band saws, lathes and grinders, for its stove fitting shop. It is the intention of the company to build at once if the weather will permit.

Power Plant Equipment.

The Westinghouse Machine Company, East Pittsburgh, has published a list of users of the Westinghouse-Parsons steam turbine. It shows that there are now in use in the United States of that type of engine 179 units, aggregating 250,000 horse-power.

The Steelton Light, Heat & Power Company, whose plant was destroyed by fire a few weeks ago, has determined to rebuild on a new site at Steelton, Pa.

The City Council of Shelbyville, Ind., is considering the putting in of a city lighting system. Chas. L. Henry, president of the Indianapolis & Cincinnati Traction Company, has offered to sell the Shelbyville power house, boilers, engines and electric equipment, with the exception of a few machines, for $25,000.

The Westinghouse Electric & Mfg. Company, Pittsburgh, has recently secured orders for between 40 and 50 alternating current induction motors to be used in Guanajuato, Mexico, mines and vicinity on the circuits of the Guanajuato Power & Electric Company. The Peregrina Mining & Milling Company is to install part of the motors at its new 120-stamp mill and mine. Part will be placed at the mine and mill of Frank B. Peck, the San Prospero Mining & Milling Company, where 60 stamps are to be installed. The motors have a capacity totaling from 1000 to 1500 horse-power. The Westinghouse Company already has motors of over 8000 horse-power capacity in similar service in the El Ore district on the Necaxa circuits.

The Niles Boiler Company, Niles, Ohio, has decided to start its foundry January 1. The foundry is equipped with a 50-ton cupola, is commanded by a 20-ton electric traveling crane and has all the necessary trackage for the advantageous loading and unloading of material. When put in commission the foundry will be capable of turning out large castings at a decided advantage. H. S. Pell, who has recently assumed charge of the Niles Boiler Company, has had a long experience in boiler shop and foundry practice, having been for a number of years superintendent with James P. Witherow & Co., New Castle, Pa., builders of blast furnaces and steel plants, and for ten years Mr. Pell was engineer and superintendent of the Stirling Company, maker of water tube boilers. With the new equipment the Niles Company is placing in its shops it will be in a position to turn out first-class work at a minimum cost.

The American Stoker Company, Erie, Pa., has acquired from the McMyler Mfg. Company, Cleveland, Ohio, its chain grate stoker business, including patterns, patents, drawings and good will, which has been operated under the trade name of the Victor chain grate stoker. F. Girtanner, the designer of the stoker and the mechanical engineer under whom it has been developed, enters the employ of the American Stoker Company. The Victor stoker has been in successful operation for some time past in various parts of the country—notably in Indianapolis, Cleveland and Erie. It is said to be a distinct advance on the general line of chain grates, having a rear attachment consisting of clinker breaker and dumping bars. The special features of this attachment are that the fires can be forced and the capacity of the boiler increased without any extra wasting of fuel and positively without smoke. The aggressive management of the American Stoker Company, combined with the merits of the Victor stoker, will undoubtedly soon make this machine an important factor in the field of automatic stoking. Hereafter it will be known as the American chain grate stoker. It will be handled by the American Stoker Company concurrently with its well-known underfeed stoker. By the acquisition of this device the company is thus enabled to offer users of power stokers of any type desired.

The General Electric Company has contracts for 600,000 horse-power of Curtis steam turbines. They are in course of construction at the company's works at Schenectady, N. Y., and Lynn, Mass. A number of specially large turbines are being built at Schenectady and the smaller sizes are manufactured at the other plant. The company has disposed of $10,000,000 worth of turbines altogether, of which 250,000 horse-power is in operation.

Foundries.

The Charles A. Stickney Company, St. Paul, Minn., has nearly completed a new foundry, 85 x 150 feet. The company manufactures gasoline engines, railroad water columns, wood saws, pump jackets, &c.

The American Cast Iron Pipe Company, Birmingham, Ala., has purchased the machine tool equipment for its new pipe plant and has about made arrangements for the wood working machinery.

The Walsh Brake Shoe & Foundry Company, Rock Island, Ill., has not yet completed plans for rebuilding its foundry, which was destroyed by fire, and does not know at this time what its requirements will be in the line of new machinery.

Bridges and Buildings.

The Vincennes Bridge Company, Vincennes, Ind., has been awarded contract at $3380 for the erection of a steel bridge at Cannelton, Ind.

The Southern Structural Steel Company, San Antonio, Texas, was awarded contract recently for the construction of a county jail at Demopolis, Ala. The contract price was $24,000.

A. Y. Bayne & Co., Minneapolis, Minn., have been awarded contract for putting in an additional truss on the outside of the Washington avenue bridge at Minneapolis, the full length of the structure being 1072 feet. The contract price is $47,987, and involves the use of about 545 tons of steel. The work of fabrication will be done at the Minneapolis plant of the American Bridge Company.

A structural steel engine house, 50 x 100 feet and 50 feet high, with crane runway, will be built by the Cherry Valley Iron Company at West Middlesex, Pa. The contract for the construction and erection of the building has been awarded to Wm. B. Scaife & Sons Company, Pittsburgh, Pa.

Fires.

The mill of the Wright Health Underwear Company, Pownal, Vt., was burned December 15, with a loss of $100,000.

The pulp mill of the Skowhegan Pulp Company and the factory of the Maine Spinning Company, Skowhegan, Maine, were destroyed by fire December 10, with total loss of $38,000.

The Union City Carriage Works, Union City, Ind., was destroyed by fire December 15, with a loss of $10,000, partly covered by insurance.

The foundry of the Ruggles Machine Company at Poultney, Vt., was recently damaged by fire. The loss is placed at about $10,000.

Hardware.

The America Company, Rockford, Ill., is removing to Momence, Ill., where a factory building 50 x 134 feet and costing $13,500 is being erected. H. Ellenberger & Co., Chicago, have the contract for the erection of this building. The America Company manufactures fishing reels, flat irons, night shooting lights, stovepipe anchors, wrenches, self-sharpening horseshoe toe calks, Odell typewriters and sewing machines.

The Imbler Fence Company, Alexandria, Ind., has incorporated with a capital stock of $10,000 to manufacture a patented fence. The company's officers are John Imbler, president; John Imbler, Jr., vice-president, and W. E. Carter, secretary and treasurer.

The National Mfg. Company, Sterling, Ill., which has heretofore been a partnership, has incorporated with a capital stock of $100,000. W. P. Benson, L. A. Bittorf and H. V. Bittorf are interested. The company manufactures door hangers and other hardware specialties.

The Banwell Hoxie Wire Fence Company, Limited, Hamilton, Ont., has been incorporated with a capital stock of $100,000, of which $70,000 is paid up, to manufacture the Peerless woven wire fencing. This company was organized by H. Banwell, formerly president of the McGregor Banwell Fence Company of Walkerville, Ont., and Vernon Hoxie, who has been superintendent of the Lamb Wire Fence Company of Adrian, Mich. A site has been purchased in Hamilton and a new factory erected. Machines are now being installed and the company expects to begin making fence early in the year.

The corporation known for many years as Schuttler & Hotz, Chicago, has been reincorporated and reorganized under the name of the Peter Schuttler Company, which will continue to manufacture the line of wagons made by the old firm.

The Continental Bolt & Iron Works, Chicago, has secured the contract for furnishing 300 tons of bolts, washers and spikes to be used in the construction of the $1,000,000 ore dock being built at Duluth, Minn., for the Duluth, Mesaba & Northern Railroad, and also a similar contract from the Great Northern Railroad Company for its new ore dock at Allouex, Wis.

The Coes Wrench Company, Worcester, Mass., manufacturer of wrenches and machine knives, is to build an addition 42 x 50 feet, one story, with skylight monitor roof. The building will be used chiefly as an addition to the knife shop, conducted as the Loring, Coes & Co., Inc., department, but it will be also employed for general manufacturing in connection with the wrench business. A large amount of special machinery will be installed, much of which will be built in the company's machine shop. This is the ninth addition the company has erected in 15 years, exclusive of the substantial improvements recently made in connection with replacing property damaged by fire.

The Ansonia Novelty Company, Ansonia, Conn., manufacturer of shears and thimbles, has purchased the plant and machinery of the Phelps & Bartholemew Clock Company of that place and will occupy the factory, taking up the manufacture of clocks in addition to thimbles and shears.

Miscellaneous.

The Middletown Automobile Body Company, Middletown, Conn., has been incorporated in Connecticut with an authorized capital stock of $50,000, of which $3000 has been paid in, to manufacture automobile bodies. C. E. Neal, New York, is president; F. W. Waychinske, secretary, and Felix Janicki, treasurer, the two latter of Middletown. The company began manufacturing in May. Contracts for new machinery have been awarded.

The Weaver Coal & Coke Company, Chicago, has purchased the Daddy's Creek property on the Tennessee Central Railroad, in Tennessee, where a plan has been mapped out for the erection of 500 coke ovens. The work of building 100 of these has already begun. This will be called the Central Coke Plant of the Weaver Coal & Coke Company, and the by-product coal from the company's mines in that district will be coked through these ovens.

The American Machine Mfg. Company, Detroit, Mich., has incorporated with a capital stock of $40,000 to take over the business of the Detroit Trolley Mfg. Company, Limited. F. V. Nicol is secretary and treasurer.

Henry D. Atwood, Taunton, Mass., sends us a statement regarding his connection with the Phœnix Crucible Company, for the purpose of correcting any misunderstanding which might have arisen from the publication of a recent item in these columns referring to his movements. He states that for many years he was interested in that company, becoming sole proprietor in 1894. In 1895 he made arrangements with the Omaha & Grant Smelting & Refining Company, Omaha, Neb., to manufacture goods for it. The understanding at that time was that the other refineries in the West should take an interest in the Phœnix company and procure their supplies of Mr. Atwood. This plan, however, was not carried into effect, and the American Smelting & Refining Company purchased the plant and installed Mr. Atwood and his son as managers. Mr. Atwood states that he simply sold the plant and not the name, patents, patterns, trademark, mixings or good will. He ran the plant until 1902, when it was sold to other parties, since deceased, and he then retired from the business. Since then he has had various propositions made to locate elsewhere, and now has several under consideration.

The Mail Line Wharfboat Company has been incorporated at Evansville, Ind., to build and operate wharfboats on the Ohio River. The directors are Ruell C. Arnold, Wm. C. Leppor and Chas. V. Williams.

The Brinker Safety Switch Attachment Company has been incorporated at West Lebanon, Ind., with $10,000 capital stock. The directors are Chas. B. Brinker, Henry H. Evans, Darwin Hobart, Jacob H. Brenner and Alexander Hamar.

The Ideal Shaft Support Company has been incorporated at Indianapolis, Ind., to make mechanical devices for supporting carriage shafts. The capital stock is $20,000; the incorporators, Sanford and Samuel W. Lanham and F. W. Bachman.

The De LeMar Copper & Lead Refining Company, a subsidiary interest of the American Refining Company, Chicago, has purchased a large tract of land near East Chicago, Ind., on which it will erect a refinery. The company has large holdings in Montana and Utah, where the ore is smelted.

The American Motor Car Company has been incorporated at Indianapolis, Ind., to build motor cars, automobiles, &c.; capital stock, $25,000. The directors are Wm. A. Moore, Wm. E. Barton and Clifton A. Cameron.

The Star Shovel & Range Company, Vincennes, Ind., has passed from the hands of a receiver and a new company has been incorporated under the same title, limited. It has $100,000 capital stock and the directors are Edward Watson, Eugene Hack, Anton Simon, Wm. A. Cullop and Chas. Eirhaus.

The Beymer Mfg. Company has been incorporated at Lafayette, Ind., with $10,000 capital stock, to manufacture sanitary churns. The directors are Wm. E. Beymer, E. Reynolds Mueller and Katherine M. Mueller.

The plant and a portion of the machinery of the defunct By-Products Paper Company, Niagara Falls, N. Y., has been purchased by Wallace I. Keep of the Lockport Paper Company and a new industry for the manufacture of tarred roofing paper is to be established. It is hoped that the new plant will be in operation by March 1. The buildings purchased are on the lands of the Niagara Falls Power Company and are numbered among the most substantial at Niagara Falls. They were originally erected for the French-Hickman Flax Fiber Company, which the By-Products Paper Company succeeded in business, but the process of neither company was successful. Electric power will be used.

The Syracuse Twist Drill Company, Syracuse, N. Y., has incorporated its business with a capital stock of $20,000 in order to give an interest to several of its employees who have been with it over twenty years and aided to build up the business. No change in the management is contemplated.

The fire in the blacksmith shop of the Buffalo Dry Dock Company, Buffalo, N. Y., was of little consequence. The machinery not being seriously damaged, it will be used in a new building that the company expects to put up during the winter. Practically no purchases of new machinery will be made.

The Hasbrouck Motor Works has moved into its new quarters at New London, Conn., and will have its shops in full working order within a few days.

The recently incorporated Toledo Ship Building Company, Toledo, Ohio, has not yet completed plans for improvements to its plant and it will be some little time before definite steps will be taken in that direction. The company has not yet reached the matter of purchase of new machinery.

The L. L. L. Elevator Controller Company has been incorporated with a New York charter and a paid up capital of $25,000 to build and install a safety device for controlling the operation of elevators. The company will have its products manufactured for a time and later on may build a plant of its own. The officers are: President, Albert W. Southard; vice-president, Charles P. Lewis; secretary and treasurer, Benjamin W. Lewis; counsel, Lewis J. Doolittle, and the Board of Directors is composed of these gentlemen and William J. Lewis. Offices have been opened in the St. Paul Building, 220 Broadway, New York.

The Goldschmidt Thermit Company of 43 Exchange place, New York, has reprinted in a pamphlet of 20 pages a paper read before the Franklin Institute on October 18 by E. Stütz. The paper deals largely with the welding of track, of locomotive frames, rudders, fly wheels and pipe by the use of thermit. One of the illustrations shows the method of introducing the thermit into the ladle of molten metal.

The Care of Patterns.

Their Classification, Designation, Marking and Storage.

BY ROBERT GRIMSHAW.

In considering the classification and storage of foundry patterns we must first see how many classes we can have and then we can better learn how to number and store them. We can classify them in any one of at least half a dozen different ways, but the classification that is fitting for one foundry will not be the best for another, where the conditions are different.

Classification.

The first general classification that occurs to some is that into component material, as iron, brass, wood, &c., because these require different storage systems. But if we commence on this division we may run into a difficulty at the first turn, for the same job may have patterns of two or three different materials. A second classification, that considers storage more than anything else, is according to size, or "large" and "small." These, however, are very relative terms and the line between the two classes is very apt to vary from year to year as the foundry takes up new lines or drops old ones, or both. A third proposition is to divide them into "domestic" and "foreign," the latter a term not quite correctly used in this connection, but still quite usual and understandable. A still further classification is into "cheap" for merely temporary and "expensive" for long continued, or at any rate frequent, use. In classification according to use we may consider all patterns that are especially for use in molding machines of any type as belonging to one class; those which are not so intended as belonging in another.

Designation according to use and size is a system which can only be carried out where the establishment starts out with a definite idea as to what it is going to make and intends to stick to it; or where, having once developed the lines in which it is to manufacture and got all needful patterns ready for the lines already running, it starts an entirely new system of classification and perhaps also a new set of storage compartments. We will say that a certain range of letters is reserved for steam engines and a certain other for pumps, or one letter for lathes and another for planers, &c., like the Dewey system of library classification, so that, for instance, 1804 L would mean an 18-inch lathe 4 feet between centers; No. 4812 L, a 48-inch lathe 12 feet between centers; No. 2404 L, a 24-inch lathe 4 feet between centers, and so on through the lathe series; while planers would get the letter P and similar numbers denoting the capacity followed by the piece number, as 4848-08 P 3, and in this manner through the range of machine tools or other products, the number of the piece following the characters designating the size or capacity and the kind of machine. This is a system that would be very dangerous to adopt. It would either be "a thing of beauty and a joy forever" or drive some one crazy.

Classification according to material of the casting leads us to remember that there are patterns for iron and those for brass, and again those for bronze and for aluminum, either pure or in alloys.

The list would seem to be at an end, but in some establishments there are various departments very properly keeping separate sets of books, so that it may be seen if any one thereof "gains or loses and how much," as the problems in arithmetic and algebra used to end. Here the distinction is not exactly like "domestic" and "foreign," as all are domestic, and the several departments use a common foundry.

We thus have quite a long series of classifications among which to choose, and whether or not we succeed in designating any one pattern as regards its membership in more than one class, as, for instance, in indicating that a certain pattern was a large, cheap wooden one belonging to a neighboring establishment, for hand molding only and to be used for aluminum bronze, it is evident that the storage itself must be on only one line, unless we could have, as in exhibitions, a system of north and south divisions according to one classification and east and west according to another, a double system that can hardly be carried out even in that case.

Designation.

When, however, we have decided how we are to classify our patterns we may better take up the system of designation as distinguished from "marking" them. They may be given numbers alone or numbers and letters together, and whether numbers alone or numbers combined with letters these may be "single" or "compound"—that is, there may be 145-5 and 145-6 or AK-B and AK-C, &c.

Where numbers are used, either alone or in combination with letters, they may be either (1) consecutive and continuous all along the line—that is, purely chronological—so that the numbers of two patterns may indicate their relative age, or (2) arranged in series, as, for instance, one set from 1 to 100, inclusive; a second from 1001 to 2000, inclusive, &c.

The designation may be either (1) entirely independent of the drawing or (2) have direct reference to the corresponding drawing, as where, for instance, the drawing is 1105 and the patterns 1105-1, 1105-2, &c. The number may again refer (3) to the piece entirely independent of the drawing, as where a certain pattern, for a name plate, for instance, is used for a casting for all sorts of machines.

In this connection it will be seen that the designation of all patterns should be made in connection with that of the drawings, where that is possible, and in any case the drafting room should have full knowledge of the pattern shop system and be provided with a card index, kept up to date, of all domestic and foreign patterns made in or coming into the establishment, with a further record of alterations, losses, returns and destruction of any pattern, effected by breakage or otherwise. The object of this is that designers may be able as far as possible to call for the use of patterns already on hand, instead of putting the establishment to the expense of making new ones which, while different enough to entail considerable expense, would yet, as far as effect is concerned, be exact duplicates of those already on hand.

It must also be remembered that the disadvantage of making new patterns affects not only the cost department; it very often means later delivery and payment of fines or loss of premiums where the order has already been received, or loss of the order where the customer is in a hurry and gives it to the firm that can make the earliest sure delivery. In war times such prompt delivery often secures the order at a greatly increased price. In times of peace 10 or 20 per cent. does not stand in the way when it is a question of a new propeller or of some other piece that, however expensive in itself, bears no important relation to the cost of the whole, of which it is a most essential component part.

Sweeps may be classed as patterns and kept with these latter, but it may be desirable to give them some additional mark, as, for instance, to add to the regular designation the letter S.

Core boxes can usually be kept with the patterns to which they belong, but in the numerical card catalogue it would be well, in addition to the pattern number, to set a C.

Stripping plates should be kept with the patterns to which they belong. Where one such plate serves for several patterns of the same outline but of different thickness it may be kept with the pattern most used, and reference be made to this fact in the card catalogue and on the drawings. They may have a P affixed to the designating number.

Where one core box is used for several different patterns it should be kept with the one likely to be most often used, if the patterns are made simultaneously; otherwise it is best to keep the core box with the first pattern. When other patterns are made which are to be used in connection with the same core box due reference to this fact can be made in the card catalogue and elsewhere, as on the drawings.

The core prints should be painted a different color from the body proper of the pattern.

In some establishments "foreign" patterns receive a temporary number, which should, however, not obliterate the proper number applied thereto by the owners—first, because it would cause confusion to the owning shop if a pattern came back either with a different number from that which it bore on being sent out or with no number at all; second, because where drawings accompany patterns sent out they may bear numbers referring to the latter, and the later drawings made by the shop receiving these patterns would bear the new numbers coming properly in its own numbering scheme. As no one knows when a borrowed pattern may have to be delivered it would be well to keep these separate from one's own.

Iron patterns require somewhat different storage than wooden ones. They are susceptible to rust in an atmosphere the moisture of which would not perceptibly swell good wooden ones. There are, however, plenty of preservative coatings which can be used to lessen this danger and render unnecessary the erection or maintenance of a separate storehouse.

Marking the Patterns.

In this connection the writer does not mean what the mark shall be but how to apply it to the pattern or other piece. In any case it is assumed that every foundry has a method of marking that shall be distinct, permanent and unmistakable. Tacking on metal letters and figures has the great advantage of delivering sharp, regular, well formed characters of uniform size and shape in the foundry. The great disadvantage, however, is that sometimes a character comes off in handling, and then the piece remains either with an imperfect mark or with a false one or with none at all. Further, the projecting letters are sometimes ugly and often a nuisance. Cut-in characters get away with this difficulty but are expensive to make and not always neat and regular. Stamping with steel punches cannot always be practiced without danger of destroying or at least injuring or defacing the pattern. Incised characters have the great advantage that they cannot be removed from the casting by accident or design. Marking with paint gives no permanent results; such marks disappear on the molding floor.

The Storeroom.

There are two principal systems adopted for the careful fire proof storage of wooden patterns by firms which have a great many such and where there is necessarily a great deal depending on their being absolutely safe from destruction or damage from fire.

The separate vault system consists in having a series of vaults lighted from overhead, separated from each other by fire proof cross walls, and which can be entered from without and from each other only through fire proof doors such as are used on shipboard. The patterns are kept in racks along aisles in bins, appropriately numbered or otherwise marked, and the utmost precaution is taken to insure that a fire never starts.

In the separate loft system anything is called a loft that is above ground and not especially fire proof. It may be a brick or a stone building or a wooden or iron frame with corrugated iron sheathing and roof, but the principle is the same. It is divided into compartments which are bulkheaded off from one another and connected only by automatically closing fire proof doors. Here also there are aisles with racks or bins in which the patterns are stored and which are marked with the numbers and other necessary characters.

It is well to have automatic sprinklers such as are used in textile mills and in theaters and which if the temperature in the protected department rises over a predetermined maximum discharge a liberal shower of water. The smaller the compartments the better such sprinklers act and the less the damage they do by water when they do go off.

Whether the vault system or the loft system is used patterns should be given out and received for storage only by daylight, except in emergency cases, as for night work for a breakdown.

British Iron and Steel Exports.—The British Board of Trade returns show that the iron and steel exports from Great Britain for November, 1905, amounted to 335,062 gross tons, as compared with 268,916 tons in November, 1904, an increase of 66,146 tons. The total for the 11 months ending November 30, 1905, was 3,434,116 tons, as against 2,974,579 tons in the corresponding period of 1904, an increase of 459,537 tons. Demand from the United States, chiefly for hematite iron to enter into steel manufactured on the Atlantic coast for export, has been the chief factor in the pig iron export trade of the United Kingdom this year. The pig iron shipments to the United States increased 111,000 tons in the first 11 months of this year over the shipments of the corresponding period of 1904. Substantial increases were shown also in the exports of wrought bars, railway material, wire products, plates, sheets, tin plate and structural material.

Move in Car Consolidation.—The Peckham Mfg. Company, Kingston, N. Y., which manufactures car appliances and street railway cars, gave a bill of sale last week of stock on hand to the York Steel & Foundry Company, a newly organized concern, with a New Jersey charter. The York Company also leased the Peckham Company's plant at Kingston for a period of 11 months, with the proviso that if the Peckham Company sold out to the car consolidation now being organized, or any other company, the lease shall terminate. The sale is said to be a move toward the car company consolidation now being organized, and it has been stated by one of those deeply interested that an announcement will be made about January 1 of its completion.

The slight decline in the price of Middlesbrough, England, pig iron, noted recently, and due to speculative operations, seems largely to have passed away. No. 3 Foundry iron, which was 52 shilings 6 pence at the opening of December, advanced to 53 shillings in the following week. Cleveland warrants were quoted by English trade reports on December 8 at 53 shillings 5 pence, as compared with 52 shillings 3 pence in the preceding week. Demand for West Coast hematite is well maintained. Stocks of iron in public stores continue to increase, and on December 7, 1905, were 747,460 tons, of which 674,800 tons was Cleveland iron in Connal's stores at Middlesbrough.

A fourth blast furnace is to be erected at the Joliet (Ill.) plant of the Illinois Steel Company and construction will be commenced shortly after the first of the year. The United States Steel Corporation has already made an appropriation covering its erection and other improvements at this plant are contemplated. It is probable that this stack will be 80 x 20 feet and will be provided with four stoves. This furnace will be known as No. 4 and will take the place of stack No. 3, which was recently dismantled, the last furnace erected at this plant now being known as No. 3. This stack will have an annual estimated capacity of about 125,000 tons and will increase the iron production of this group of furnaces to 525,000 tons annually.

The finishing department of the pipe mill of the Mark Mfg. Company, Chicago, located at Evanston, Ill., was destroyed by fire last week. Although the damage was heavy, the other departments of this plant did not suffer and are operating as usual. While the building was destroyed the machinery and furnaces were only slightly damaged, and the work of rebuilding has already commenced and the reconstruction will be carried on rapidly. Owing to the company's large pipe producing facilities only a temporary inconvenience will be suffered.

The American Shipbuilding Company, Cleveland, Ohio, has booked an order from Pickands, Mather & Co., Cleveland, for a steel steamship which is to have a carrying capacity of 11,000 tons. The boat will be 550 feet over all, 530-foot keel, 60-foot beam and 31 feet deep, and will be completed some time next July.

The Iron and Metal Trades

The report in one of the leading daily newspapers that the United States Steel Corporation has on its books orders aggregating over 7,300,000 tons is true. No one fact could better serve to show the condition of the steel works and rolling mills of the country, since it is well known that the other large companies are similarly committed for their full capacity for a long period to come.

There have been rumors of cancellations during the past few days, which on investigation resolve themselves into the solitary probability that the material for the railroad enterprises of John R. Walsh of Chicago, whose failure was announced this week, will not be required. It is estimated that this involves a fair quantity of rails and some rolling stock. It will leave rather a welcome gap in the rolling programme of the mills affected.

It is semi-officially announced that the policy of the United States Steel Corporation in handling its Pig Iron purchases will be guided by a determination to prevent any undue rise in prices. Whatever metal is available will be taken, but if there is a shortage to cover requirements, the latter will be scaled down. The Steel Corporation is making about 900,000 tons per month and needs from 30,000 tons to 40,000 tons of outside Iron per month, running at the present rate. The new Mingo furnace in the Wheeling district will start in January and the slowing down of the mills for repairs and for the holidays will allow some accumulation. In the interests of a stable market it is believed to be wiser to slightly curtail operations at the steel works rather than take the risk of forcing the market up by buying relatively insignificant quantities of outside Iron.

A shortage of Basic Pig has again developed in the Eastern markets. One Steel works took 5000 tons at $17.90, delivered; another took a like quantity, while a third purchased 15,000 tons in addition to purchases of 10,000 tons made a short time ago. A fourth Eastern Steel company is now in the market for 18,000 to 20,000 tons for delivery during the second half of 1906.

The scarcity of Steel is indicated by the fact that the Ohio works of the Carnegie Steel Company will be taken off from Rails and put on Sheet and Tin Plate Bars in January. Only about 75 per cent. of the Sheet mill capacity of the corporation can now be operated on account of the scarcity of Steel, while 92 per cent. of the Tin mills are running, when more capacity ought to be employed. It was hoped that the Wire trade would slacken this month so that Steel could be diverted, but the pressure on the Wire mills is too great.

The Structural trade is working under tremendous pressure, the open winter facilitating outdoor operations. The product of the new Chicago and Clairton mills of the Steel Corporation has been absorbed without relieving the situation. Next month the new mill of the Jones & Laughlin Steel Company will be in operation. It will roll intermediate sizes and have a capacity of 8000 tons a month.

A heavy tonnage is coming up for bridges for the railroads. There are now in the market inquiries from three systems alone which need 72,000 tons among them. The demand for Steel for buildings is very heavy. Chicago notes one lot of 11,000 tons for a county building. In Pittsburgh bids are going in for two structures requiring 12,000 tons and New York has a number of large structures which may soon be ready for contracting, unless the labor situation should become too serious.

There is a heavy export movement in progress, and a very much larger tonnage could be taken were it not for the pressure of requirements from the home markets. Among recent inquiries is an aggregate of 20,000 tons of Rails for New South Wales and Mexico. The large Canadian business has not yet been placed.

The Cast Iron Pipe industry continues to flourish. It is stated that never before so far in advance of the season had so much business for spring delivery been booked. Philadelphia gas interests have just placed heavy contracts, but as they were distributed among several foundries the total tonnage is not known. The Philadelphia Water Department will shortly call for bids on a large quantity of 48-inch Pipe and it is expected that the New York Department of Water Supply will ask bids on a large lot of the same size. Bids will again be opened Friday on 30,000 tons of Pipe by the latter and it is expected that they will be somewhat more numerous than before.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 20, 1905.	Dec. 13, 1905.	Nov. 22, 1905.	Dec. 21, 1904.
PIG IRON:				
Foundry No. 2 Standard, Philadelphia	$18.25	$18.25	$18.25	$17.25
Foundry No. 2 Southern, Cincinnati	16.75	16.75	16.75	15.75
Foundry No. 2, Local, Chicago	*19.25*	19.25	19.50	17.00
Bessemer, Pittsburgh	**18.35**	18.35	18.10	16.85
Gray Forge, Pittsburgh	**17.10**	17.10	16.75	15.85
Lake Superior Charcoal, Chicago	**20.00**	20.00	19.50	18.50
BILLETS, RAILS, &c.:				
Bessemer Billets, Pittsburgh	26.00	26.00	26.00	21.00
Forging Billets, Pittsburgh	30.00	30.00	30.00	25.00
Open Hearth Billets, Philadelphia	30.00	30.00	30.00	24.00
Wire Rods, Pittsburgh	**32.50**	32.50	32.00	30.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	16.50	16.50	16.50	15.50
O. Steel Rails, Philadelphia	18.25	18.25	18.25	17.00
O. Iron Rails, Chicago	23.00	23.00	23.00	22.00
O. Iron Rails, Philadelphia	**24.50**	24.50	24.00	20.00
O. Car Wheels, Chicago	**19.00**	19.00	18.00	16.50
O. Car Wheels, Philadelphia	**18.75**	17.50	17.00	15.00
Heavy Steel Scrap, Pittsburgh	*17.50*	17.50	18.00	16.50
Heavy Steel Scrap, Chicago	*15.00*	15.25	15.25	14.25
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philade'phia	1.83½	1.83½	1.83½	1.63½
Common Iron Bars, Chicago	1.85	1.85	1.85	1.65
Common Iron Bars, Pittsburgh	**1.90**	1.90	1.80	1.54½
Steel Bars, Tidewater, New York	1.64½	1.64½	1.64½	1.54½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.40
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.64½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.50
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.64½
Beams, Pittsburgh	1.70	1.70	1.70	1.50
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.64½
Angles, Pittsburgh	1.70	1.70	1.70	1.50
Skelp, Grooved Steel, Pittsburgh	1.55	1.55	1.55	1.45
Skelp, Sheared Steel, Pittsburgh	1.65	1.65	1.65	1.50
SHEETS, NAILS AND WIRE:				
Sheets, No. 27, Pittsburgh	2.20	2.20	2.20	2.10
Wire Nails, Pittsburgh	1.80	1.80	1.80	1.75
Cut Nails, Pittsburgh	**1.70**	1.70	1.65	1.75
Barb Wire, Galv., Pittsburgh	2.25	2.25	2.25	2.20
METALS:				
Copper, New York	**19.00**	19.00	17.00	14.87½
Spelter, St. Louis	**6.50**	6.40	6.00	5.70
Lead, New York	**6.00**	6.00	5.70	4.60
Lead, St. Louis	**5.80**	5.75	5.50	4.52½
Tin, New York	**36.37½**	36.00	33.60	29.00
Antimony, Hallett, New York	**13.00**	13.00	12.25	8.75
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.59	3.59	3.59	3.64

Chicago.

FISHER BUILDING, December 20, 1905.—(*By Telegraph.*)

The strength of the Western market is reflected in the maintenance of Iron and Steel values on a firm basis, notwithstanding the lull in the demand for Pig Iron and certain finished products. Furnace operators are not inclined to make concessions to consumers for either immediate or future deliveries, and finishing mills rather welcome this curtailment in demand, which will enable them to catch up on deferred deliveries. Heavy specifications indicate a continued record consumption, and Malleable and Steel Casting foundries are endeavoring to anticipate shipments. The open weather is favorable to the heavy movements of Iron to consumers' yards, and Gray Iron foundries that always meet with a slackening in demand at this season of the year have not yet attempted to hold up deliveries. Steel shortage continues to curtail the production of Finished Materials, while lessened Pig Iron output at Western Steel works furnace plants, which is certain to result from unfavorable weather conditions, will still further curtail Steel production. The new Open Hearth plant of the Illinois Steel Company at South Chicago, which will have a daily output of 700 tons, is being hurried to completion and efforts are being made to make the first cast within 30 days. Contracts for 20,000 tons of Standard Section Rails were placed this week, this tonnage being made up of two orders from two trunk lines entering Chicago and an electric road which purchased 8500 tons. Plate and Shape requirements for two lake boats aggregating 8000 tons were also placed, and the Steel for four additional vessels is under negotiation. The contract for furnishing the Steel for the new County Building, aggre-

gating 11,000 tons, will be let this week, and bids have been asked for the Steel for two additional buildings, a total of 4000 tons. Large contracts for Track Materials accompany all Rail orders, Western mills having already sold their output through the first half of next year. Advances in Spikes, ranging from $1 to $2 a ton, have been made, and higher prices are looked for on Track Bolts. The heavy outcome of Scrap has resulted in a softening in prices on material used by Iron mills, while Steel Scrap, on the other hand, is readily absorbed. The failure of three local banks has caused no disturbance in financial conditions owing to the active steps taken by other financial institutions to avert a panic. It is probable that extensions to the Southern Indiana Railroad undertaken by its owner, John R. Walsh, the dominant factor in the embarrassed banks, will not go forward, and will probably result in the cancellation of orders for approximately 50,000 tons of Rails and a large amount of rolling stock.

Pig Iron.—There have been no recent transactions of note, and sales are limited almost entirely to small lots for immediate shipment. Both Northern and Southern furnaces are keeping up with specifications, and notwithstanding the heavy deliveries the foundries are taking in shipments without complaint. Wherever possible Malleable and Steel Casting plants are anticipating shipments, and the close of the year has had no effect on the activity of Gray Iron foundries. While it is possible that $14.50, Birmingham, could be shaded 25c. a ton for No. 2, this is only possible with a few stacks that held out for higher prices and did not take their proportion of the heavy tonnage placed during the recent buying movement. Western Steel works continue short of Iron and stocks on hand are unusually low. The output of Furnace No. 1 of the North works of the Illinois Steel Company will be available in a few days, but the company's new furnace under erection at South Chicago will not be completed until May or June next year. Furnace B of the Iroquois Iron Company was blown out last week for relining, and the production of Northern Iron has thereby been curtailed about 250 tons daily. Further advances have been made on High Silicon grades, although little new tonnage is offered. We quote at Chicago as follows:

Lake Superior Charcoal	$20.00 to $20.50
Northern Coke Foundry, No. 1	19.75 to 20.00
Northern Coke Foundry, No. 2	19.25 to 19.50
Northern Coke Foundry, No. 3	18.75 to 19.00
Northern Scotch, No. 1	20.00 to 20.50
Ohio Strong Softeners, No. 1	20.05 to 20.30
Ohio Strong Softeners, No. 2	19.55 to 19.80
Southern Coke, No. 1	18.65 to 19.15
Southern Coke, No. 2	18.15 to 18.65
Southern Coke, No. 3	17.65 to 18.15
Southern Coke, No. 4	17.15 to 17.65
Southern Coke, No. 1 Soft	18.65 to 19.15
Southern Coke, No. 2 Soft	18.15 to 18.65
Southern Gray Forge and Mottled	16.65 to 17.15
Malleable Bessemer	19.50 to 20.00
Standard Bessemer	19.30 to 19.55
Southern Basic	18.65 to 19.15
Jackson Co. and Kentucky Silvery, 6%	21.30
Jackson Co. and Kentucky Silvery, 8 %	22.30
Jackson Co. and Kentucky Silvery, 10 %	24.30

Metals.—Consumers that have been holding off in anticipation of a declining market are now compelled to cover at the advanced prices prevailing, and the buying of Lead, Copper, Tin and Spelter has been in large volume during the week. Further advances on all metals except Zinc have been recorded and the upward movement of Tin at the present rate will soon put prices above records. We quote: Casting Copper 20¾c. to 21¼c.; Lake, 21c. to 21½c.; Pig Tin, car lots, 38c. to 38½c.; small lots, 39c. to 40c.; Spelter, prompt delivery, 6¾c. to 7c., for car lots; Lead, Desilverized, 6c. to 6¼c.; Corroding, 6½c. to 7c.; for 50-ton lots; on car lots, 2¼c. per 100 lbs. higher; Sheet Zinc is $7.75 list, f.o.b. Lasalle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 16¾c.; Heavy Copper, 16¼c.; Copper Bottoms, 15½c.; Copper Clips, 16¼c.; Red Brass, 15¼c.; Red Brass Borings, 12¾c.; Yellow Brass, Heavy, 11¼c.; Yellow Brass Borings, 10c.; Light Brass, 8½c.; Lead Pipe, 5c.; Tea Lead, 4½c.; Zinc, 4.85c.; Pewter, No. 1, 22c.; Tin Foil, 28c.; Block Tin Pipe, 27½c.

(By Mail.)

Billets.—Western rolling mills continue short of Steel and no relief is in sight. The new Open Hearth plant of the Illinois Steel Company at South Chicago, which will have a capacity of about 700 tons daily, is being pushed to completion at a record rate, and the indications are that the first Steel will be made early in January. Rolling Billets are no longer offered in this market, and the small tonnage of Forging Billets available is held on the basis of $35, without extras, f.o.b. Chicago.

Rails and Track Supplies.—There is no apparent abatement in the demand for either Rails or Track Materials, notwithstanding the winter season. Heavy contracts for Spikes and Track Bolts were received during the past week accompanying Rail orders. Owing to the heavy tonnage on the books of the mills an advance on Spikes was announced this week, and while 1.95c. can still be done in large lots on ordinary business 2c. is quoted. Bolts are also firm, and an advance is looked for before the first of the year. Rail orders for the week placed with the Western mill aggregate 20,000 tons, of which 8500 tons was placed by a Western electric road. Demand for Light Rails continues fair, and specifications on existing contracts are very heavy. We revise quotations as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 1.95c. to 2c.; Track Bolts, 2.50c. to 2.60c., base, Square Nuts. The store prices on Track Supplies range from 15c. to 20c. above mill prices. Light Rails, 30 lb. to 45 lb. Sections, $27 to $27.50; 25-lb., $28 to $28.50; 20-lb., $29 to $29.50; 16-lb., $30 to $30.50; 12-lb., $31 to $31.50; lighter Sections down to 8-lb., $36 to $40, f.o.b. mill. Standard Sections are quoted $28, f.o.b. mill, full freight to destination.

Plates.—Contracts for the Plate requirements for two lake boats were placed this week, aggregating 4000 tons. The requirements for four additional vessels are under negotiation, aggregating 8000 tons, and will be placed within a few days. Steel car specifications are heavier than at any time in the history of the Steel car industry, and on Bolster Plates the mills are from two to three months behind on deliveries. Quotations remain unchanged, as follows: Tank quality, ¼-inch and heavier, wider than 6¼ and up to 100 inches wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 inch, 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 inches, 1.86½c., base, for ¼-inch and heavier, with the same advances for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-inch and heavier, up to 72 inches wide, 2c. to 2.10c.; from 72 to 96 inches wide, 2.10c. to 2.20c.; 3-16 inch up to 60 inches wide, 2.10c. to 2.20c.; 72 inches wide, 2.35c. to 2.45c.; No. 8 up to 60 inches wide, 2.15c. to 2.25c.; Flange and head quality, 25c. extra.

Bars.—Steel Bar specifications continue greatly in excess of mill shipments, and the inability of consumers to secure sufficient material to meet their requirements from mills has resulted in a heavy warehouse trade. The demand for Iron Bars continues good and practically all of the sales made by the mills are on the basis of 1.85c. to 1.90c., and the leading interest is securing some business at 2c. Quotations are unchanged, as follows: Iron Bars, 1.85c. to 2c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.01½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras, and Hard Steel Angles and Bars are now quoted on practically the same basis as Soft Steel. Store prices are as follows: Bar Iron, 2.20c. to 2.25c.; Soft Steel Rounds and Squares, 2 inches and larger, 2c., base; Flats, 2 and 4 inches by 1⅛ inch and thicker, 2c., base; Flats, 4½ x 5 inches and 6 x 5-16 inch and thicker, 2c.; all Ovals, Half Ovals and Half Rounds, 2c.; Steel Bands are held at a minimum of 1.95c. to 2c., half extras; Soft Steel Hoops, 2.30c., full extras, with 5c. to 10c. higher than the minimum prices named for small quantities from store.

Sheets.—Late official prices are well maintained, notwithstanding the reports of $1 rebate on Black Sheets in large lots. Mill specifications on existing contracts continue very heavy, but the new business that is offered is light. Store demand is not very great, nor is a big increased demand looked for until after the first of the year. We quote: Blue Annealed, Nos. 9 and 10, 1.81½c. to 1.86½c.; Blue Annealed, Nos. 18 to 20, 2.16½c. to 2.21½c.; No. 27, 2.36½c. to 2.41½c.; No. 28, 2.46½c. to 2.51½c., with the customary differentials between gauges. Store prices are 2c. to 2.10c. for No. 10 Blue, 2.05c. to 2.15c. for No. 12 Box, 2.10c. to 2.20c. for No. 14, 2.20c. to 2.30c. for No. 16, 2.40c. to 2.50c. for Nos. 18 to 20, 2.45c. to 2.55c. for Nos. 22 and 24, 2.50c. to 2.60c. for No. 26, 2.55c. to 2.65c. for No. 27, 2.65c. to 2.70c. for No. 28 and 3.15c. to 3.35c. for No. 30. Galvanized Sheets, in car lots from mill: Nos. 10 and 11, 2.36½c. to 2.41½c.; Nos. 17 to 21, 2.71½c. to 2.76½c.; No. 27, 3.26½c. to 3.31½c.; No. 28, 3.46½c. to 3.51½c.; Galvanized Sheets from store: Nos. 10 to 14, 3c. to 3.10c.; Nos. 16 to 20, 2.90c. to 3c.; Nos. 22 to 24, 3.05c. to 3.15c.; No. 26, 3.25c. to 3.35c.; No. 27, 3.45c. to 3.55c.; No. 28, 3.65c. to 3.75c.

Structural Material.—Shape requirements for two additional lake boats were placed with the Carnegie Steel Company this week, aggregating 4000 tons. The Steel for four additional boats is now under negotiation, aggregating about 8000 tons, and will be placed this week. Jobbers continue to receive from 2.25c. to 2.75c. for stock material and shipments continue to be made to both Eastern and Western points. Quotations on future shipments from mill are as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.86½c.; Angles, 3 to 6 inches, ¼ inch and heavier, 1.86½c.; Angles, larger than 6 inches on one or both legs, 1.96½c.; Beams, larger than 15 inches, 1.96½c.; Zees, 3 inches and over, 1.86½c.; Tees, 3 inches and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending or other shop work.

Merchant Pipe.—Official discounts are no longer being shaded and the Pipe market, notwithstanding the present off season, is in better shape than it has been for nearly a year,

so far as the maintenance of prices is concerned. This, of course, is largely due to the high prices prevailing on Skelp, the spread between the raw material and the finished product not covering the cost of manufacture. The market's minimum is represented by the following official discounts: Black Steel Pipe, 78.35 per cent. on the base sizes ¾ to 6 inches, and Galvanized, 68.35 per cent. Iron Pipe is quoted from 1½ to 2 points higher. From store in small lots Chicago jobbers are quoting 76½ to 77 per cent. on Black Steel Pipe, ¾ to 6 inches.

Boiler Tubes.—The local demand is limited almost entirely to shipments from jobbers' stocks and these of late have been heavy on account of the activity of the Western boiler shops. Quotations are well maintained. Official discounts, base sizes, in carlots, are as follows: Steel Tubes, 62.35; Iron, 51.35; Seamless, 50.35; 2½-inch and smaller and lengths over 18 feet, and 2¾-inch and lengths over 22 feet, 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1½ inches	40	35	42½
1¾ to 2¼ inches	50	35	35
2½ inches	52½	35	30
2¾ to 5 inches	60	47½	42½
6 inches and larger	50	35	..

Cast Iron Pipe.—The Pipe trade has settled down to a period of inactivity and no large contracts will be placed until after the first of the year. No municipal lettings are even under consideration, and no transactions of importance are looked for before February. Quotations are unchanged, as follows: Water Pipe, 4-inch, $31; 6, 8, 10 and 12 inch, $30; over 12-inch, $29, with $1 extra for Gas Pipe. Large municipal contracts are usually placed at somewhat lower basis.

Merchant Steel.—The new business that is reaching the mills is not very heavy, although specifications on existing contracts are in many instances in excess of shipments. The pressure for deliveries is unusually great, wagon and implement makers being unusually insistent for heavy shipments. Large contracts are now being closed for next season's requirements of shafting at ruling discounts. Prices are unchanged as follows: Planished or Smooth Finished Tire Steel, 1.70c.; Iron finish up to 1½ x ½ inch, 1.65c., and Iron finish, 1½ x ½ inch and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ⅞ and 1 inch, 2c., and 1⅛-inch and larger, 1.90c., Pittsburgh; Smooth Finished Machinery Steel, 1.91½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.86½c.; Cutter Shoe, 2.40c.; Toe Calk Steel, 2.21½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting, 50 per cent. discount on car lots and 45 per cent. in less than car lots, in base territory.

Coke.—Heavy consignments of Connellsville Coke have reached this market during the past ten days, and owing to the very favorable shipments that are being made to consumers on contracts shippers experience considerable difficulty disposing of material on consignment. Several large lots were sold on the basis of $3 at the ovens, or $5.65, Chicago, and sales at $5.85 to $6 were numerous. Contracts for By-Product Coke for delivery through the first half of next year are being closed on the basis of $6.15, Chicago. Very little Virginia Coke is coming into this market, as the car shortage in the Virginia fields is acute, and producers are only securing sufficient cars to take care of the regular trade.

Old Materials.—The market is easier and dealers have been offering some material at concessions of from 25c. to 50c. a ton from last week's quotations. The continued open weather has been very favorable for the heavy outcome of Old Material and consumers generally are not interested in covering requirements at the prices that have been prevailing. Railroad offerings have also been heavy and dealers who paid $19 for No. 1 Wrought two weeks ago are now offering the same at a loss of from 50c. to 75c. a ton. The general easing off, however, is only considered temporary, as the situation would be easily reversed with a short spell of unfavorable weather conditions. Railroad lists have been issued this week by the Chicago, Burlington & Quincy, the Pere Marquette and the Cincinnati, Hamilton & Dayton roads, aggregating 4000 tons. The range of prices paid by large consumers to producers and dealers, car lots, f.o.b. Chicago, is as follows:

Old Iron Rails	$23.00 to $23.50
Old Steel Rails, 4 feet and over	16.50 to 17.00
Old Steel Rails, less than 4 feet	16.50 to 17.00
Heavy Relaying Rails, subject to inspection	26.50 to 27.00
Old Car Wheels	19.00 to 19.50
Heavy Melting Steel Scrap	15.00 to 15.50
Frogs, Switches and Guards	15.50 to 16.00
Mixed Steel	13.00 to 13.25

The following quotations are per net ton:

Iron Fish Plates	$20.00 to $20.50
Iron Car Axles	23.50 to 24.00
Steel Car Axles	18.00 to 18.50
No. 1 Railroad Wrought	18.00 to 18.50
No. 2 Railroad Wrought	17.00 to 17.50
Locomotive Tires, smooth	14.25 to 14.50
Railway Springs	15.00 to 15.50
No. 1 Dealers' Forge	13.50 to 14.00
Wrought Pipes and Flues	12.50 to 13.00
Mixed Busheling	12.50 to 13.00
Iron Axle Turnings	12.50 to 13.00
Soft Steel Axle Turnings	12.50 to 13.00
Machine Shop Turnings	12.00 to 12.50
Cast Borings	10.00 to 10.50
Mixed Borings, &c	9.75 to 10.00
No. 1 Mill	10.00 to 10.50
Country Sheet	9.00 to 9.25
No. 1 Boilers, cut to Sheets and Rings	12.00 to 12.50
No. 1 Cast Scrap	15.00 to 15.50
Stove Plate and Light Cast Scrap	12.00 to 12.50
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.50 to 15.00

Philadelphia.

REAL ESTATE TRUST BUILDING, December 19, 1905.

The Iron and Steel markets have been even quieter than during the two or three weeks preceding, with little or no prospect of improvement in the immediate future. This, of course, is in accordance with the usual conditions at this season of the year and should in no respect be regarded as signifying unfavorable developments. Buying must end somewhere and some time, and this is perhaps the best time for doing it. For several months most of the purchasing has been in anticipation of requirements during the earlier months of 1906, and that being fairly completed there is no necessity for further action until after the turn of the year, and even then it will depend a good deal upon what may turn up during the next three or four weeks. The trade are so accustomed to big things, however, that they hardly feel satisfied unless prices are moving one way or the other. At present they are not entirely sure that an advance is pending, and while that feeling continues very little new business will be done. The next movement will not begin until it is pretty clear that higher prices are coming or that actual needs force consumers into the market. A movement in the direction of lower prices is not given serious consideration, but if the dullness becomes very protracted it will be a somewhat severe test, and while there may be no decline, the failure to realize an advance will be something of a disappointment, and in times like these sentiment counts for a good deal. There is no question as to the soundness of the business situation, but with a production of more than 3,000,000 tons of Pig Iron monthly and prospects of a further substantial increase it will be no easy matter to find buyers willing to pay higher prices until there is distinct evidence that consumption will be larger than it is at the present time. The chances indicate that it will be larger as the season advances, but two or three months even on the same basis as at present will not stimulate prices. If prices are going higher it will be under the stimulus of increased consumption and that can hardly be expected at this season, although it is confidently looked for a little later.

Pig Iron.—The market has been very quiet during the past few days. There are many reasons why this should be so and very few why it should be otherwise, and that without any impairment in general conditions. The outlook is, in fact, extremely favorable, but after the immense purchases that have been almost continuous since the late summer months, it is fitting that there should be a period during which the entire situation may be considered from a new standpoint. It is estimated by careful and experienced statistical authorities that early in the coming year the capacity for the output of Pig Iron will be at the rate of 30,000,000 tons per annum, and if that should materialize it would seem as though buyers need not be greatly troubled in regard to a shortage, nor in regard to materially higher prices. Of course something may occur to modify this view of the situation, but in the meanwhile it may be regarded as something that will require serious consideration. The current output appears to be easily absorbed, but an increase of 20 per cent. "doth give us pause," and well it may. There are two ways of looking at it, however, one being that the theoretical estimate will not be realized, the other is that a great deal more Pig Iron will be wanted in 1906 than in any former year, so that in any case there is no great probability that the balance will be sufficiently changed as to affect prices, although under such circumstances it is quite natural that buyers will hold off until there is some pretty clear indication of what will be done after the first of the year. As far as regards sales, they have been quite small and at about the same prices as quoted last week. It cannot be said that the undertone is anything more than steady to firm. Buyers can get all they want at quoted rates, but sellers are quite independent and give themselves no concern if buyers refuse to pay the price. There is some scarcity of Steel making Irons and for prompt shipments a little extra price can be had, but that does not help very much, as it sometimes means the diversion of Iron from one buyer to another. Moreover, it is thought that some of the urgency is to get in as much of the low priced lots as far as may be possible, which will help to make a better average on the more recent purchases. The fine open weather has no doubt done much toward relieving the tension, and if it continues there need be no great apprehension of a Pig

Iron scarcity. General quotations for Philadelphia and nearby deliveries are about as follows:

No. 1 X Foundry	$19.00 to $19.25
No. 2 X Foundry	18.25 to 18.75
No. 2 Plain	17.75 to 18.00
No. 2 Southern	18.75 to 19.00
Standard Gray Forge	16.25 to 16.50
Basic	17.75 to 18.00
Low Phosphorus	24.00 to 24.50
Bessemer	19.50 to 19.75
Malleable Iron	19.00 to 19.25

Steel Alloys.—It is quite impossible to give reliable quotations, which are so wide apart that they might be supposed to be fictitious; yet they are given by responsible houses and are certainly correct as far as sales are concerned, which are given as $75 for 80 per cent. Ferro for the last half of 1906, and in another case a much higher figure for the same delivery. Silico Spiegel is said to have been sold at $45, but in reply to a cable inquiry $85 was quoted for 100-ton lots, deliveries during January, February and March. It is a question of getting the material at any price, so that quotations are purely a matter of speculation, but the range would probably be within the figures named below:

Silico Spiegel, 10 and 18 per cent	$45.00 to $60.00
Ferrosilicon, 50 per cent	97.00 to 100.00
Spiegeleisen, 20 per cent	40.00 to 48.00
Ferromanganese, 80 per cent., $125 January or for last half of 1906, $90.	

Steel.—The demand is active and prices are firmly maintained at $30 for large lots of Open Hearth Steel; small lots, $33 to $35, and special Steel, $40 to $45.

Muck Bars.—Inquiries continue to be made in anticipation of a demand for Skelp Iron, but so far actual business is very light. Puddled Bars from all Pig Iron are quoted at $28.75 to $29, seller's mill, or $27.50 to $28 for Bars made from Scrap Material.

Plates.—Business is unusually satisfactory for the time of the year. New business is in large volume and specifications are promptly given, so that the mills are fully employed. Prices should be a little better, but for the present they are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.73½	1.78½
Flange or Boiler Steel	1.83½	1.88½
Marine, A. B. M. A. and Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½

The above are base prices for ¼-inch and heavier. The following extras apply:

	Per 100 pounds extra.
3-16-inch thick	$0.10
Nos. 7 and 8, B. W. G.	.15 "
No. 9, B. W. G.	.25 "
Plates over 100 to 110 inches	.05 "
Plates over 110 to 115 inches	.10 "
Plates over 115 to 120 inches	.15 "
Plates over 120 to 125 inches	.25 "
Plates over 125 to 130 inches	.50 "
Plates over 130 inches	1.00 "

Structural Material.—There is still considerable difficulty in getting prompt deliveries, but it is expected that there will be some relief in the near future, not only because of the increase in output by the American mills but also because imports are being made from Germany. It is understood that these shipments are not for sale in the open market, but will be applied on work being done by constituent companies of the United States Steel Corporation, although to that extent it will help out elsewhere. Prices are unchanged at 1.83½c. to 2c. for Beams, Channels, Angles, &c., but premiums have to be paid to secure deliveries during the early months of the coming year.

Bars.—The market is not particularly active, but there is a demand which enables the mills to maintain a firm position. On the whole it is a long time since the feeling was as satisfactory as it is at the present time. Orders are good, specifications are promptly given and prices are steady at 1.83½c. for Refined Iron, and practically the same or more for Steel Bars if prompt deliveries are required.

Sheets.—Business is rather quiet, but prices are steady as last quoted—viz.: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c., and No. 28, 2.80c.

Old Material.—The market is quiet and without quotable change in prices. The Steel situation is rather a hard problem. Consumers claim that the supply is excessive and prices lower, while dealers contend that they have no Steel to offer at less than $18.50 to $19. Other descriptions are dull at unchanged prices. Bids and offers for deliveries in buyers' yards are about as follows:

Scrap Steel Rails	$18.25 to $18.50
No. 1 Steel Scrap	17.50 to 18.50
Low Phosphorus Scrap	23.50 to 24.00
Old Steel Axles	21.50 to 22.50
Old Iron Axles	27.00 to 27.50
Old Iron Rails	24.50 to 25.00
Old Car Wheels	18.75 to 19.50
Choice Scrap, R. R. No. 1 Wrought	22.00 to 22.50
No. 1 Yard Scrap	20.00 to 20.50
Long and Short	19.00 to 19.50
Machinery Scrap	16.00 to 16.50
Wrought Iron Pipe	16.50 to 17.00
No. 1 Forge Fire Scrap	16.25 to 16.75
No. 2 Light Ordinary	13.00 to 13.50
Wrought Turnings	14.50 to 15.00
Axle Turnings, Choice Heavy	15.50 to 16.00
Cast Borings	10.50 to 11.00
Stove Plates	13.25 to 13.75
Grate Bars	12.75 to 13.00

Pittsburgh.

PARK BUILDING, December 20, 1905.—(*By Telegraph.*)

Pig Iron.—The usual holiday lull is now on in the Pig Iron trade, and while there is not much inquiry prices are very firm and may go higher after the first of the year if a buying movement should start. A feature of the situation just now is that consumers of Iron are urging the furnaces for shipments instead of asking them to withhold deliveries, which they usually do in the holiday season. The absolute minimum price of Bessemer Iron seems to be $17.50 at Valley furnace and it is doubtful whether any small tonnage could be bought at less. The Steel Corporation has not yet bought any first quarter Iron, but is expected to come in before January 1 for a round tonnage for first quarter delivery. There is only a fair inquiry for Foundry Iron, but prices are very strong on the basis of about $17.50 for Northern No. 2 at Valley furnace. It is possible that a few furnaces might slightly shade this price, but not over 25c. a ton. There is not much inquiry for Forge Iron, Northern brands being very firm on the basis of $16 to $16.25, Valley furnace, or $16.85 to $17.10, Pittsburgh. We note a sale of 3000 tons of Bessemer Iron for delivery in the first four months of next year at $17.50, Valley furnace.

Steel.—While there is not an urgent inquiry for Steel, most consumers being covered by contracts, prices remain very firm and the mills are still behind in shipments, especially on Sheet and Tin Bars. We quote Bessemer and Open Hearth Billets at $26, and Sheet and Tin Bars in long lengths at $27, maker's mill. Part of the Ohio works of the Carnegie Steel Company will go on Sheet and Tin Bars on January 1 and this will help out the company on delayed deliveries.

(*By Mail.*)

The whole Iron market continues on a most satisfactory basis and the new tonnage being placed in Finished Iron and Steel is remarkably heavy for this season of the year. One thing that has had much to do with the present satisfactory condition is the open weather, which has permitted outside work to go on without interruption. This has influenced to a very great extent the demand for Plates, Structural Steel, Tin Plate, Sheets and Pipe, for all of which very heavy tonnage is being placed. While no large sales of Pig Iron have been made in the past week, we can report a very firm market, with a probability of higher prices after the first of the year. Bessemer Pig Iron is very firm at $17.50 at furnace, and the small outside lots that were being offered about a week ago at a little less than this price have been pretty well cleaned up. Basic Pig Iron could probably be bought at about $17.25 at the furnace, but is firm at this price. There is a moderate inquiry for Foundry Iron, but large consumers are covered and are not in the market. We quote Northern brands at $17.25 to $17.50 at Valley furnace. There is some inquiry for Forge Iron, which is firm at $16 to $16.25, Valley furnace. We note a continued scarcity of Steel, Bessemer and Open Hearth Billets readily bringing $26, maker's mill, for prompt shipment.

Muck Bar.—A local consumer recently bought 2000 tons of Muck Bar, 500 tons at $29.50 and 1500 tons at $30.50, Pittsburgh, the last lot being for delivery over the first six months of the year. Prices on local makes of Muck Bar are very firm at $31 to $31.50, Pittsburgh, while the Republic Iron & Steel Company is holding its Muck Bar at $32. Prices have reached such a high point that Eastern Mills can now deliver Muck Bar in the Pittsburgh district, which is being offered at $30 to $30.50, delivered.

Ferromanganese.—Foreign 80 per cent. Ferro for spot shipment continues to command $125 a ton or higher, and sales of about 50 tons are reported in the past week. On contracts for delivery commencing in May or June, 1906, from $85 to $90 a ton is being quoted.

Rails.—Official advices are that the mills have closed very nearly 2,000,000 tons of Rails for 1906 delivery. The

mills have pretty well cleaned up this year's tonnage and will close the year practically ready to start on next year contracts. Some heavy Rail tonnage is pending, including one contract for about 40,000 tons for a large Eastern road. The Carnegie Steel Company will probably take the Ohio Works off Rails on January 1 and operate the plant on Billets, Sheet and Tin Bars. It is very much behind on deliveries on Sheet and Tin Bars and can use the output of the Ohio Works on delayed contracts. Prices on Light Rails, which were recently advanced, are very firm, and we quote: 8-lb., $37 to $38; 10-lb., $33 to $34; 12-lb., $30 to $31; 16-lb., $28 to $29; 25 to 45 lb., $26.50 to $27.50, maker's mill.

Rods.—The heavy tonnage in Wire products is reflected in Wire Rods, for which there is a good deal of inquiry. We quote Bessemer and Open Hearth Rods at $32.50 to $33, and Open Hearth Chain Rods, $33, maker's mill.

Skelp.—The demand continues active and the mills are still considerably behind in deliveries. We quote: Grooved Steel Skelp, 1.55c. to 1.60c.; Sheared, 1.65c. to 1.70c.; Grooved Iron Skelp, 1.65c. to 1.70c., and Sheared, 1.75c. to 1.80c. These prices are for ordinary widths and are f.o.b. maker's mill.

Plates.—Additional Plate orders for lake boats, aggregating about 10,000 tons, have recently been placed, most of the business being taken by the leading local interest. The Plate interests will have a conference this week in New York relative to an advance in prices. The larger interests are opposed to an advance, but it is strongly favored by three or four who buy their Steel in the open market. The general demand is not as heavy as it has been, but the leading mills are filled for some months ahead and are more concerned in getting out tonnage than in booking new contracts. Prices are firm and we quote: Tank Plates, ¼ inch thick, 6¼ up to 100 inches in width, 1.60c., base, at mills, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16-inch Plates on thin edge	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 inches	.05
Plates over 110 to 115 inches	.10
Plates over 115 to 120 inches	.15
Plates over 120 to 125 inches	.25
Plates over 125 to 130 inches	.50
Plates over 130 inches	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
Marine, "A. B. M. A.," and ordinary Fire Box Steel Plates	.20
Still Bottom Steel	.30
Locomotive Fire Box Steel	.50
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.40c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 inches wide down to 6 inches of Tank, Ship or Bridge quality.

Structural Steel.—No large local contracts have recently been placed, but the American Bridge Company and McClintic-Marshall Construction Company have recently taken a heavy tonnage of Eastern work and large contracts are pending. Bids for the Union National Bank Building and the Commonwealth Trust Company to be erected in this city, and which will take about 12,000 tons, will be asked for before the first of the year. The leading Structural interests are filled up with work for some months and are quoting rather higher prices for new erection than ordinarily would be the case. The mills still continue very much behind in deliveries, which is delaying work considerably. The Jones & Laughlin Steel Company expects to have its new Structural mill in operation in January. It will roll intermediate sizes and will have a capacity of about 8000 tons a month. We quote: Beams and Channels, up to 15-inch, 1.70c.; over 15-inch, 1.80c.; Angles, 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.70c.; 8 x 8 and 7 x 3½ inches, 1.80c.; Zees, 3-inch and larger, 1.70c.; Tees, 3-inch and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-inch are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—The demand is surprisingly large for the season, partly due to the favorable weather which has permitted uninterrupted building construction. There is a continued scarcity of Sheet Bars and some of the mills are having trouble in getting them promptly. Prices continue very firm and we quote: Black Sheets, Box Annealed, one pass through cold rolls, 10 to 12 gauge, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2c.; Nos. 17 to 21, 2.05c.; Nos. 22 to 24, 2.10c.; Nos. 25 and 26, 2.15c.; No. 27, 2.20c.; No. 28, 2.30c.; No. 29, 2.45c., and No. 30 gauge, 2.55c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.25c.; Nos. 12 to 14, 2.35c.; Nos. 15 and 16, 2.45c.; Nos. 17 to 21, 2.60c.; Nos. 22 to 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.15c.; No. 28, 3.35c.; No. 29, 3.60c., and No. 30, 3.85c. We quote No. 28 gauge Painted Roofing Sheets at $1.65 per square and Galvanized Roofing Sheets, No. 28 gauge, at $2.90 per square for 2½-inch corrugations. Jobbers charge the usual advances over above prices for small lots from store.

Iron and Steel Bars.—The demand for both Iron and Steel Bars continues very large, and specifications are piling in so fast that the mills are unable to catch up on delayed deliveries. We understand that the Crucible Steel Company is now quoting 1.60c. for Steel Bars on account of the high price it is paying for Billets. Consumers whose contracts have been filled do not hesitate to place new ones on the present basis of Steel Bar prices, believing that the situation is assured for the coming six months at least. We quote Steel Bars at 1.50c., base, half extras, for carloads and larger lots. We quote Iron Bars at 1.90c., Pittsburgh, but note that the Republic Iron & Steel Company continues to quote Iron Bars at 2c., Youngstown, which with the freight added is equal to 2.04¾c., Pittsburgh.

Hoops and Bands.—A fair amount of new tonnage is being placed, but the mills are running mostly on contracts, on which specifications are coming in very freely. We quote Steel Hoops at 1.85c. and Bands to be used for cooperage purposes at 1.85c., the latter carrying full Hoop and Band extras. Bands for other than cooperage purposes are 1.50c., base, half extras, as per Standard Steel card. Above prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery.

Tin Plate.—The active demand for Tin Plate noted in this report for several weeks still continues, and it is stated that the American Sheet & Tin Plate Company could be operating practically all of its Tin Plate capacity if a full supply of Tin Bars could be assured. The independent mills report a heavy demand. In fact, the Tin Plate trade is very much more active than usual at this season of the year. We are advised that several mills are asking slight premiums in prices for prompt delivery. We quote Tin Plate at $3.40 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days. Some mills allow a rebate of 5c. a box on the above price to the large trade.

Merchant Steel.—While not very much new business is being placed the mills are filled with specifications on contracts, on which they are considerably behind in deliveries. Prices are very firm and we quote: Planished or Smooth Finished Tire Steel, 1.70c.; Iron finish up to 1½ x ½ inch, 1.65c., and Iron finish, 1½ x ½ inch and larger, 1.50c., base. Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ⅞ and 1 inch, 2c., and 1⅛-inch and larger, 1.90c.; Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.65c. to 1.70c.; Cutter Shoes, 2.20c. to 2.25c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. Demand for Shafting is heavy, which we quote at 50 per cent. discount in carloads and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—New demand continues heavy, largely on account of favorable weather, which has permitted track laying later in the season than usual. We quote Railroad Spikes at $2 to $2.05 per 100 lbs., f.o.b. maker's mill.

Spelter.—While the demand for Spelter is not very heavy, there is a disposition on the part of producers not to sell, and prices continue firm. We quote prime grades of Western Spelter at 6.30c. to 6.40c., St. Louis, equal to 6.47½c. and 6.62½c., Pittsburgh.

Merchant Pipe.—General conditions in the Pipe trade are very satisfactory, the merchant demand being much heavier than usual at this season of the year. A report was current here this week that the National Tube Company had advanced prices on both Steel and Iron Pipe $2 a ton, but this is untrue, the report probably arising from the fact that A. M. Byers & Co. advanced prices on Iron Pipe one point, or $2 a ton, quoting the Merchant sizes at 75 per cent. off list. There has been no change in prices of Steel Pipe, nor are there indications of any advance in the near future. The report that the National Tube Company would abandon its Youngstown mill is wholly without foundation. The mill is idle at present, but will likely be started shortly after January 1. Prices of Pipe continue exceedingly low, the extreme discount on Merchant sizes being 81 per cent. off to the large trade. Official discounts are as follows:

Merchant Pipe.

	Jobbers, carloads.				Consumers, carloads.			
	Steel.		Iron.		Steel.		Iron.	
	Blk.	Galv.	Blk.	Galv.	Blk.	Galv.	Blk.	Galv.
	%	%	%	%	%	%	%	%
⅛ and ¼ inch	72	56	69½	53½	71	55	68½	52½
⅜ and ½ inch	76	64	73½	61½	75	63	72½	60½
¾ to 6 inches	80	70	78	68	79	69	77	67
7 to 12 inches	75	60	73	57½	74	59	72	56½
Extra strong, plain ends:								
⅛ to ¾ inch	65	53	62½	50½	64	52	61½	49½
⅛ to 4 inches	72	60	69½	57½	71	59	68½	56½
4½ to 8 inches	68	56	65½	53½	67	55	64½	52½
Double extra strong, plain ends:								
⅛ to 8 inches	61	50	58½	47½	60	49	57½	46½

Boiler Tubes.—Current demand is light, but the mills are busy on contracts on which specifications are coming in at a fairly satisfactory rate. There is some unevenness in prices of Boiler Tubes, which are being shaded more or less, depending on the order. Discounts which are more or less shaded are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ inches	41	44
1¾ to 2¼ inches	41	56
2½ inches	46	58
2¾ to 5 inches	53	64
6 to 13 inches	41	56

Iron and Steel Scrap.—As we get nearer the close of the year the demand for Scrap grows smaller, as consumers will not take in any this year that they can possibly avoid. There is more pressure on the part of the dealers to sell and prices are easier. We quote: Heavy Melting Scrap, $17.50 to $18; No. 1 Wrought Scrap, $19.50 to $20; Cast Iron Borings, $10.75 to $11; Bundled Sheet Scrap, $15 to $15.25; Old Steel Rails, short pieces, $17.50 to $18; long pieces, which seem to be in fairly active demand, are held at $18; Machinery Cast Scrap, $15.50 to $15.75; Cast Steel Scrap, $17.50; Old Iron Axles, $27 to $27.50; Old Iron Rails, $24.50 to $25; Malleable Iron Scrap, $15.50; Steel Turnings, $13.75 to $14; Old Car Wheels, $18, all in gross tons, f.o.b. Pittsburgh. On a firm offer it is probable that prices on some lines of Scrap quoted above would be slightly shaded.

Coke.—With the end of the year only two weeks away it is evident that this year will mark the heaviest Coke movement in the history of the trade. The output for many weeks past in the Upper and Lower Connellsville regions has been averaging from 360,000 to 365,000 tons a week and shipments from 13,500 to 14,000 cars a week. Most large consumers of both Furnace and Foundry Coke are covered by contracts and new demand is rather light. Best grades of Connellsville Furnace Coke are being offered at $2.75 to $2.85 a ton at oven. Outside makes of Furnace Coke, which are not quite as high in quality as Connellsville, are being offered as low as $2.25 a ton at oven. Strictly Connellsville 72-hour Foundry Coke is firm at $3.40 to $3.50 a ton at oven. Of the 30,679 ovens in the Upper and Lower Connellsville regions, only 13,041 were idle last week, the output of both regions having been 373,297 tons, much the heaviest output of Coke in any one week in the history of the Connellsville Coke trade.

Birmingham.

BIRMINGHAM, ALA., December 18, 1905.

Pig Iron.—Practically no change has taken place in the Iron situation this week, but while everything is quiet the market is strong at prices prevailing for the past month. The reported softening is seemingly untrue, as all the producers when interviewed claimed to be maintaining the price of $14.50 for No. 2 Foundry. There was a price made by a brokerage concern of $14.25 on a few hundred tons for immediate shipment, but upon investigation it was ascertained that this was Iron the house had purchased some months since for its own account and was willing to shade the price in order to realize. Few inquiries or orders are reported, but the furnaces have practically all their output booked for the first quarter of next year and are therefore not in position to take on any large tonnage for delivery during that time. The car situation is daily growing worse, the railroads not being able to furnish sufficient dumps to handle the raw materials from the mines to the furnaces. This is due largely, however, to the inability of the furnace operators to unload them promptly on account of scarcity of labor.

The furnace of the Central Iron & Coal Company at Tuscaloosa was blown out on December 12 for general repairs and relining, and as the material for relining has not been assembled, owing to inability to secure fire brick, it will probably be several months before the furnace will be able to resume operations.

The Sloss-Sheffield Steel & Iron Company has blown out its No. 2 City furnace for repairs and relining, which it is figured will require about three months. This is a 200-ton stack.

The Tennessee Company has been forced to bank one of its furnaces at Bessemer owing to a shortage of Coke, and it is possible that others will have to be banked over the holidays.

It is probable that the production of Pig Iron in this district for the month of December will fall considerably short of what it has been for the past few months, all of the large companies having one or more furnaces out of blast at this time either temporarily or undergoing repairs.

The Coal output for the State of Alabama for the year 1905 will probably exceed 12,000,000 tons, surpassing 1904 by more than 1,000,000 tons. Many new openings have been made, and but for the strike of the United Mine Workers, which has been on since July, 1904, the production would have probably reached 14,000,000 tons. All of the large furnace companies, with the exception of the Alabama Consolidated, are working their coal properties on the open shop plan, and while the struggle has been a hotly contested one their output is now sufficient for all requirements.

Old Material.—Dealers report a very quiet week, due probably to the holiday season and the inactivity of Pig Iron. Fairly good stocks are on the yards and prices have been shaded about 25c. a ton from last week's figures. We quote as follows per gross ton:

Old Iron Rails	$21.75 to $22.25
No. 1 Railroad Wrought	19.75 to 20.25
No. 2 Railroad Wrought	18.25 to 18.75
No. 1 Country Wrought	17.25 to 17.75
No. 2 Country Wrought	16.75 to 17.25
Wrought Pipe and Flues	14.25 to 14.75
Mixed Steel	13.25 to 13.75
No. 1 Machinery Cast	12.25 to 12.75
Stove Plates and Light Cast	10.75 to 11.25

Cleveland.

CLEVELAND, OHIO, December 19, 1905.

Iron Ore.—Now that the sales of Ore have been about completed for the year 1906 vessel men and shippers are getting together on the question of season charters. Contracts made by the more prominent vessel interests were at rates identical with those charged this year, being 75c. from the head of the lakes to Lake Erie ports, 70c. from Marquette and 60c. from Escanaba. Chartering is being done, it is said, on the basis of a shipment of 30,000,000 tons. A report is current that the United States Steel Corporation has made arrangements with two fleets to virtually operate their boats, to increase the carrying capacity of the corporation fleet to 12,000,000 tons. The normal capacity of its fleet is 10,000,000 tons, allowing for the boats lost recently. It is understood that in all about 10,000,000 tons have been covered so far with the strictly merchant fleets. The arrangements have not been made for the docking of the Ore, but it is understood there is hardly likely to be any change, regardless of the complaints of vessel interests. The cost of handling Ore on the docks has been reduced by the introduction of automatic machinery and it had been hoped that this would bring about a lessening of the docking charge.

Pig Iron.—The market has been unusually quiet. Specifications against old contracts have been heavy, but it is apparent that new orders are coming in very slowly. The market is disposed to be hopeful as to the outlook of the general Steel situation for the coming year, but occasional expressions are heard that raw materials are getting too high for the present basis of finished products. Furnaces in this territory are comfortable as to second quarter business and are not disposed to rush customers. Most of the Iron sold in this territory now comes from the Southern companies, which still have some Iron to sell for spot shipment and through the first half. They quote $14.50, Birmingham, for No. 2, to which is added $3.85 freight rate to make up the Cleveland price. Northern furnaces are quoting nominally $18 at the furnace for No. 2, few of them having any Iron to sell. The Steel making Irons are stronger, with a good steady demand for Basic and Bessemer. All present quotations are on the basis of $18 in the Valleys. The Coke trade is holding steady.

Finished Iron and Steel.—Reports reach this territory that the Eastern mills have been getting more business here of late. This cuts off the supply of some of the consumers of Structural Shapes in this territory, since it has been noted that many of the buyers have been piecing out their needs from the Eastern mills. This restriction of the supply throws the consumers back almost entirely upon the jobbers in this territory. Prices on spot Structural range all the way from $5 to $15 a ton at the mill above the official price. The demand for Structural Shapes and Plates has been increased in this territory during the week by the addition of some boat orders to those already placed. Enough boats have been ordered to keep almost all of the lake yards busy through the ensuing summer. The demand for Steel from that quarter, therefore, is expected to be unusually strong, although some of the tonnage has already been provided for on contracts. Several boats have been purchased by Steel companies under a contract upon which they agree to furnish the Steel when needed. The Billet situation is strong. One of the Southern mills came in, offering Forging Billets at slightly over $35, Cleveland, and the buyers, being unable to cover their needs elsewhere, have bought. It is stated, however, that one or two of the mills which withdrew from the market 60 days ago to permit them to catch up on their orders are about ready to enter the trade again and this may relieve the situation slightly. Bessemer 4 x 4's are selling at $30 to $32, Cleveland. On Plates premiums are being occasionally paid, but this is not a general practice, some mills being able to take orders for shipment in 30 days. On a large assortment of Bars a premium of $2 was paid during the past week, but in the majority of cases the official price of 1.50c., Pittsburgh, applies. The agricultural implement works are specifying heavily on their contracts. The buying of Sheets is showing improvement and the market is strong on the basis of the new prices. The stock trade is good. Quotations hold out of stock at

2.05c. for No. 10 Blue Annealed, 2.65c. for No. 28 One-Pass Cold Rolled, and 3.65c. for No. 28 Galvanized.

Old Material.—The market has been active, with dealers holding for higher prices. The mills, however, while forced to buy to cover their needs, have been systematically hammering prices. The following shows the range of quotations, being dealers' prices to the trade, gross tons: Old Steel Rails, $16.50 to $17.50; Old Iron Rails, $23 to $24; Iron Car Axles, $16.50 to $17.50; Heavy Melting Steel, $16.50 to $17.50. Net tons: Cast Borings, $9.50 to $10.00; No. 1 Busheling, $15 to $15.50; No. 1 Railroad Wrought, $16.50 to $17.50; Iron Car Axles, $22 to $23; No. 1 Cast, $14 to $15; Stove Plate, $11; Iron and Steel Turnings and Drillings, $11 to $12.

Cincinnati.

FIFTH AND MAIN STS., December 20, 1905.—(*By Telegraph.*)

Pig Iron.—As is usually the case at this season of the year the market is quiet and unresponsive, but with the general tone apparently strong and reasonably firm. Everything points to continued growth in consumption and the indications are that stocks will show a still further decrease over the preceding month. Requests to hurry shipments forward are in evidence, and we are told of some instances where they have been anticipated and sent forward before actually due. Reports indicate that the average stock in consumers' yards is below what it was thought it would be, which is a very fair indication as to what is being done in the line of consumption. Quite a number of consumers are said to be in the market for the first quarter, when it was supposed that most of them had their requirements taken care of for this period. This would indicate that additional business beyond their expectations had come forward and consumed the Iron that otherwise would have been surplus stock. The demand for Basic and other Steel making Iron seems to be in excess of the supply, and as a result manufacturers are compelled to run very close. There is no reserve stock to speak of, and it is necessary for them to depend largely on current shipments to keep in operation. Charcoal Irons are very firm, with the supply somewhat restricted. Gray Forge has shown considerable activity during the week and has been sold at a shade below regular quotations. We learn of one sale of 2000 tons to a rolling mill in Indiana on a $12.75 Birmingham basis, delivery to commence in March, running through the second quarter. Southern No. 2 is apparently firmly established at $14, Birmingham basis, and while some of the furnaces are holding for $14.50, we have been unable to learn of any tonnage having been sold in this territory that would exert any influence on market quotations. We are advised, however, that 2000 tons of No. 2 Soft was sold in the Birmingham district for local delivery at this latter figure. This, however, did not come in competition with Tennesee or Northern brands and has no bearing on the matter. Northern Iron is strong and firm, with prices about as last week. Freight rates from Hanging Rock district to Cincinnati are $1.15, and from Birmingham $2.75. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1	$17.25
Southern Coke, No. 2	16.75
Southern Coke, No. 3	16.25
Southern Coke, No. 4	15.75
Southern Coke, No. 1 Soft	17.25
Southern Coke, No. 2 Soft	16.75
Southern Coke, Gray Forge	15.50
Southern Coke, Mottled	15.25
Ohio Silvery, No. 1 (8 % Silicon)	21.15
Lake Superior Coke, No. 1	19.15
Lake Superior Coke, No. 2	18.65
Lake Superior Coke, No. 3	18.15
Car Wheel Irons.	
Standard Southern Car Wheel	$22.25 to $22.75
Lake Superior Car Wheel	21.00 to 21.50

Coke.—The situation is reported to be somewhat easier in some sections, but the matter of equipment is still very serious and is causing much delay. Contracts during the week have been quiet and no new developments are reported. We quote the best grades of 72-hour Foundry from both Connellsville and Wise County districts at from $3.50 to $3.75, f.o.b. ovens.

Finished Iron and Steel.—The market continues strong and prices are firm. The weather has been an important factor in the situation in the way of allowing structural work to proceed without interruption. New business is said to be coming forward in plentiful supply and conditions are very satisfactory. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same in small lots, 1.85c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, ¾ x 3-16 and heavier, 1.83c., in carload lots.

Old Material.—The past week has been a little less active and there has been nothing offering out of the ordinary. Prices maintain a firm front and are unchanged from last report. We quote dealers' prices, f.o.b. Cincinnati: No. 1 Railroad Wrought Scrap, $17 to $17.50 per net ton; No. 1 Cast Scrap, $14 to $14.50 per net ton; Iron Rails, $20 to $21 per gross ton; Steel Rails, rolling mill lengths, $15 to $15.50 per gross ton; Relaying Rails, 56-lb. and upward, $24.50 to $25 per gross ton; Iron Axles, $22.50 to $23 per net ton; Car Wheels, $16.50 to $17 per gross ton; Heavy Melting Scrap, $15 to $15.50 per gross ton; Low Phosphorus Scrap, $18.50 to $19 per gross ton.

German Iron Market.

BERLIN, December 4, 1905.

Reports from all sections of the German Iron trade for the past few weeks have been uniformly favorable. In all quarters extreme activity in production and distribution is recorded. The home market is outdoing itself in the strength of its consumptive demand and the foreign market has increased its takings from week to week. The latest statistics are those for October, which registered exports of 319,168 metric tons. This denotes the heaviest outgo since April, 1903.

Large Exports.

There were only two other months in the heavy export campaign of three years ago that showed larger exports than October, 1905. The exports for October exceeded those for September by 41,552 tons, and those for October, 1904, by not less than 95,439 tons. Some of the increases in the October movement are significant, when compared with those of October, 1904. Thus the exports of Pig Iron increased from 19,088 tons to 36,875; Angles from 27,967 tons to 40,876; Steel Rails from 17,238 tons to 22,432, and Railroad Ties and Secondary Railroad Supplies from 2063 tons to 25,889 tons. The heaviest increases in the last named goods were to Argentina and the United States, while the gain in Steel Rails went chiefly to Holland, England and Argentina. The increase in the exports of Steel Blooms, Billets, Ingots, &c., was 6000 tons, which went chiefly to England. Other considerable increases were in Plain Wire, 6800 tons, and Galvanized, 2000 tons. In Machinery and Implements the large gain of 25,700 tons over October, 1904, was recorded.

Increase in Production.

Production, too, has gained at a more rapid rate than indicated in my last letter. The make of Pig Iron for October passed, for the first time in Germany's history, the 1,000,000-ton mark. The month's production reached 1,006,943 metric tons. This exceeds the make for October, 1904, by 138,120 tons, which denotes a gain of almost 16 per cent.; and it beats September, 1905, by 53,163 tons. This indicates with sufficient force the accelerating rate of production. Many new furnaces, too, are mentioned in the trade reports as coming into operation, so that it seems certain that high-water mark has not yet been touched by any means in the present Iron boom. Germany will certainly make above 12,000,000 tons in 1906.

Prices Rising.

Prices have further strengthened in some lines of goods since my last report. Further increases are also under discussion in various sections of the trade. The Lorraine-Luxemburg Syndicate has just raised the home price of Pig Iron by 1 franc per ton, the foreign price by 2 francs. This, it is added, still leaves the export price somewhat lower than the home price. The new prices there are 64 francs for Forge Iron and 69 francs for Manganese qualities. Business in that district is reported very active and all works running at their full capacity. In the Siegen district another advance of Ore prices is about to be made for the second quarter of 1906. According to one version the advance will be 20 marks per carload of 10 tons, while another version gives it as 10 marks. It is believed that further advances of general Iron prices will be made later, in view of the restriction imposed by the Steel Verband and minor organizations of orders at existing prices to rather short periods; and it has already been intimated that the advance in Ore prices just mentioned will necessitate a further marking up of Iron prices.

Syndicate Operations.

The activity of the trade is well illustrated by the latest figures of the Steel Verband. According to news published to-day the organization took home orders in November for 214,000 metric tons of half-rolled goods, as compared with 92,000 tons in November, 1904; while foreign orders rose to 156,000 tons, as compared with 80,000. The foreign business of the Verband underwent a considerable increase in October, and the published figures of home and foreign shipments in half-rolled goods, railroad material and structural forms for that month show the heaviest movement since the Verband was organized.

The Verband is preparing to reorganize the method of making rebates upon exported goods. Hitherto its practice has been to pay a fixed rebate upon proof that a given quantity of Iron or Steel goods has been exported, without regard to the price obtained. It is now proposed, however, to

ascertain in all cases what the price was and then pay a drawback in proportion to the difference between it and the home price. It was also decided to give such a drawback only to concerns that are in some trade combination, which means that in practice the drawback shall be confined to members of the Wire associations and the Black Sheet combination.

At a recent meeting of the Steel Verband the allotments in Plates and Sheets, Car Axles and similar goods and Pipe were increased by 5 per cent. A similar increase in Bar Iron and Rolled Wire was also asked for by some of the works, but this was refused for the present. The Verband, however, is very careful to keep full control of the market situation, and for this purpose the increased allotments were made conditional upon proof on the part of each establishment that its sales during the following three months actually show a 5 per cent. increase. The Verband does this because the 5 per cent. increase in Half Rolled goods, Rails and Ties and Structural forms voted last spring has not yet been fully worked up to by some establishments.

The Cast Iron pipe syndicate, which expires according to contract at the end of March, will, it is confidently believed, be renewed. Some establishments, indeed, have demanded increased allotments, but most of them have declared their wish to continue the organization, and a meeting for the purpose of completing the new terms of the syndicate was held at Duesseldorf yesterday. At this meeting it was mentioned that all the establishments are fully supplied with orders and an increase of prices was pronounced necessary in view of the dearer prices of raw materials.

It is learned that the Steel Verband is in negotiations with Austrian Iron works looking toward the renewal of the arrangement existing between it and them in respect to noninterference in each other's territory. This agreement refers to Girders and other Structural forms, and under it the Verband takes no orders from Austria, while the Austrian establishments refuse to make sales in Germany.

New York.

NEW YORK, December 20, 1905.

Pig Iron.—There have been sales aggregating fully 30,000 tons of Basic Pig for Steel works in eastern Pennsylvania and there are under active negotiation fully 35,000 tons more. This includes from 18,000 to 20,000 tons for one interest, which calls for delivery during the second half of 1906. There was some additional buying of Forge earlier in the week, but little has been done lately. The demand for Foundry Iron is somewhat active in some sections and rather dull in others. Among the inquiries at hand, which total from 18,000 to 20,000 tons, is one for 6000 tons and one for 5000 tons. One of the leading Southern makers has recently appeared again as a seller, both in the Albany district and in New England. We quote: Northern No. 1 Foundry, $18.75 to $19; No. 2 Foundry, $18.25 to $18.50, and No. 2 Plain, $18 to $18.25, tidewater. Southern Iron is selling on the basis of $18 to $18.25, tidewater.

Steel Rails.—Foreign inquiries have come in recently representing 20,000 tons of Rails, of which 4000 tons are wanted in Mexico, while the greater part is for New South Wales. The Monterey mill got a portion of the recent Southern Pacific order, but it is questionable if it will be able to make the deliveries called for by the Mexican inquiry. Two or three good sized requisitions are under negotiations, representing tonnages from important lines.

Structural Material.—The tonnage placed in the past week has been rather light in comparison with the rate at which business has been booked in the past few months. Bids have been asked on about 17,000 tons of bridge work for the Tidewater Railway. Of the New York Central new terminal work 10,000 to 12,000 tons will be ready for bids at once, this covering the building in which the post office substation will be located. Important Western and Central Western railroad bridge work is soon to be awarded, taking in more than half the 100,000 tons in this line that has been hanging recently. In New York City several downtown building projects are coming up for figures on the Steel, the delay in some cases being attributed in part to disturbed labor conditions, while the possibility of more advantageous prices on some materials of construction apart from Steel may have its influence. One building for which Steel will soon be bought will require 7000 tons. The Passaic Steel Company, Paterson, N. J., has taken a 500-ton order for sugar house work on the Pacific Coast and one of 1350 tons for additions to the Dupont Powder Company's plant at Wilmington, Del. We quote prices on tidewater delivery, mill shipment, as follows: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. Beams, 18 to 25 inches, 0.10c. extra; Angles over 6 inches, 0.10c. extra. Sales out of stock, cut to length, are made at from 2.50c. to 3c.

Plates.—Local business is still very quiet. Considerable interest is shown in the pending conference of the Plate manufacturers to be held this week in this city. Naturally the announcement of the conference brings with it the expression of the belief on the part of some of those connected with the trade that an advance may at last be decided upon. Quotations at tidewater for shipment from mills are as follows: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 1.94½c. to 2.04½c.; Fire Box Plates, 2.04½c. to 2.60c., according to specifications.

Bars.—The situation in Bars continues satisfactory, although transactions are light, as is usual at this season. Bar Iron is held at 1.90c. to 1.95c., tidewater, for prompt delivery, while Steel Bars are quoted all the way from 1.64½c. to 2c., tidewater, according to the delivery desired, the lower quotation being made on contracts for future delivery.

Cast Iron Pipe.—Philadelphia gas interests have bought heavily of late, but the tonnage is not known as the business was distributed among a number of foundries. The Philadelphia Water Department will shortly ask for bids on a large quantity of 48-inch Pipe, and it is rumored that the Department of Water Supply of this city will also soon ask for bids on a large quantity of similar size. New bids on 30,000 tons for this city will be opened on Friday and it is stated that many more bidders will compete for the business than when bids were previously opened. Never before, it is stated, were so many orders for spring delivery in hand so long in advance of the season as at this time. Prices are higher and carload lots are now quoted at $29.75 per net ton for 6-inch at tidewater.

Old Material.—Business continues in good volume. Further sales of Heavy Melting Steel Scrap have been made at full prices. Cast Scrap is very strong and active, with one sale reported of about 800 tons at equal to $16, New York. Plenty of small lots are going. A sale is reported of 500 tons of Grate Bars at $13, delivered. Borings and Turnings are in demand. No. 1 Railroad Wrought Scrap can be disposed of easily, but City Wrought is inclined to quietness. Quotations are approximately as follows for New York and vicinity per gross ton:

Old Iron Rails	$22.50 to $23.00
Relaying Rails	25.00 to 26.00
Old Steel Rails, rerolling lengths	16.50 to 17.50
Old Steel Rails, short pieces	16.50 to 17.00
Heavy Melting Steel Scrap	16.50 to 17.00
Standard Hammered Iron Car Axles	26.00 to 27.00
Old Steel Car Axles	21.00 to 22.00
No. 1 Railroad Wrought	21.50 to 22.00
Iron Track Scrap	18.50 to 19.25
No. 1 Yard Wrought, long	19.50 to 20.50
No. 1 Yard Wrought, short	17.50 to 18.50
Wrought Pipe	15.25 to 15.50
Light Iron	11.50 to 12.00
Cast Borings	9.25 to 9.50
Wrought Turnings	13.00 to 13.50
Old Car Wheels	18.00 to 18.50
No. 1 Machinery Cast	15.00 to 15.25
Stove Plate	12.00 to 13.00
Malleable Cast	15.50 to 16.50

Metal Market.

NEW YORK, December 20, 1905.

Pig Tin.—As usual, Pig Tin advanced during the week, following the lead of the London market. The pronounced strength of the American market has been caused by the small arrivals from Europe as well as the small shipments afloat, the arrivals so far this month amounting to but 1650 tons, while 1840 tons are afloat for American ports. Of this about 600 tons will arrive this month, making the total arrivals for the month of December approximately 2300 tons. This indicates that the statistical condition of the metal will continue to be very strong at the opening of the year. There will undoubtedly be a falling off in consumption during this month on account of partial shut down of the Tin Plate mills due to lack of Tin Bars as well as the decreased demand for Solder. The prevailing high prices are likewise restricting the consumption, consumers being unwilling to make any large commitments with prices at the present high level. The London market closed to-day slightly lower than last week at £165 2s. 6d. for spot, and £164 2s. 6d. for futures. The New York market to-day is lower at 36.37½c.

Copper.—As far as actual business is concerned there is very little to record. There is no large amount of business for the very good reason that there is practically no metal to sell for spot delivery and futures are also fairly well covered for January and February shipments. Strictly spot stocks command prices ranging from 19c. to 19½c., according to the urgency of the consumer's needs. For shipments during January and February prices are subject to premiums ranging above 19c., according to the takings of the consumer. March, April and May deliveries can probably be obtained at 18½c. to 19c. It is said on high authority that a good sized lot has been sold for late May shipment and June delivery at 18½c. There are many things which point to the belief that slightly lower prices will be the rule after lake navigation opens, among them being the fact that some producers are very willing to market their product at the present prices, another being the reluctance of European

consumers to take American metal at the present high prices. The high prices are still attracting the attention of the Chinese, who are reselling small lots purchased earlier in the year. The London market has been less firm and £79 5s. is quoted for spot and £78 17s. 6d. for futures.

Spelter.—This metal is decidedly firmer than a week ago, spot December and January being sold at 6⅝c., New York delivery. In St. Louis the market is also firm at 6.50c. There is an excellent inquiry and some good sales have been made at the prevailing prices. The London market is practically unchanged at £28 12s. 6d.

Pig Lead.—There is less strength in the market than a week ago, due to the arrivals of foreign Lead, and one 50-ton lot has been freely offered at 6c., with no takers. The scarcity of spot stocks seems to be relieved for the present but whether this will continue for any length of time is a matter of conjecture. The leading interest continues to quote shipment Lead in 50-ton lots, New York delivery, at 5.35c. This price is subject to change without notice, and orders are only taken at the price current on date of shipment. In the London market prices are lower, £17 being quoted for Soft Spanish Lead.

Antimony.—A fair volume of business is being done at current prices, which are unchanged from last week. Cookson's is quoted at 13c. to 13.50c.; Hallett's at 12.75c. to 13c.; other brands, 12.25c. to 12.75c.

Nickel.—The old price of 45c. for large lots continues in force, smaller quantities being sold at 50c. to 55c.

Quicksilver.—For jobbing lots of 100 flasks of 75 lbs. each, $40 per flask is asked in the New York market. In San Francisco domestic orders are held at $39. In London Rothschild's price is unchanged at £7 5s.

Tin Plate.—The leading interest and the independent mills have been obliged to curtail their production, due to the marked scarcity in Sheet Bars. There is a good demand and specifications on contracts continue to come in freely. The price remains unchanged on a basis of $3.59, f.o.b. New York, or $3.40, f.o.b. Pittsburgh. In Swansea Welsh Plates are unchanged, at 12s. 6d.

Old Metals.—There has been little activity in the Old Metal market, but all forms are very scarce and firmly held by dealers. The prices are practically unchanged from last week. Dealers' selling quotations for large lots, New York delivery, are about as follows:

	Cents.
Copper, Heavy Cut and Crucible	17.75 to 18.25
Copper, Heavy and Wire	17.25 to 18.00
Copper, Light and Bottoms	15.75 to 16.25
Brass, Heavy	11.50 to 12.00
Brass, Light	9.75 to 10.50
Clean Brass Turnings	10.25 to 10.75
Composition Turnings	13.25 to 13.75
Heavy Machinery Composition	15.25 to 15.75
Lead, Heavy	5.40 to 5.50
Lead, Tea	5.15 to 5.25
Zinc, Scrap	4.85 to 5.10
Aluminum Scrap	20.00 to 25.00

Iron and Industrial Stocks.

NEW YORK, December 20, 1905.

The stock market was firm up to Monday morning, when the news was received of the enforced liquidation of three banks in Chicago controlled by the same interests. This caused a sharp decline in prices followed by a quick recovery when the fact became known that the other Chicago banks had assumed the obligations of the banks in liquidation. The lowest prices touched on active stocks during the period of weakness on Monday were as follows: Can preferred, ex-dividend, 68; Car & Foundry common 38¾, preferred 98; Locomotive common 67¼; Colorado Fuel 51¼; Pressed Steel common 53¼; Railway Spring common 58½; Republic common 32½, preferred 103¾; Sloss-Sheffield common 87; Tennessee Coal 137; Cast Iron Pipe common 43⅞; United States Steel common 37, preferred 103⅝. The highest prices realized on the recovery on Monday or on Tuesday were as follows; Can preferred 69; Car & Foundry common 39⅞, preferred 98½; Locomotive common 69¼; Colorado Fuel 58; Pressed Steel common 55¾; Railway Spring common 60½; Republic common 34¾, preferred 104¼; Sloss-Sheffield common 90½; Tennessee Coal 148; Cast Iron Pipe common 45½; United States Steel common 38⅜, preferred 105¼. Last transactions on active stocks up to 1.30 p.m. to-day were made at the following prices: Can common 9, preferred 68; Car & Foundry common 39½, preferred 98½; Locomotive common 68¾, preferred 116⅛; Steel Foundries common 13⅜, preferred 47⅛; Colorado Fuel 56¼; Pressed Steel common 54⅞, preferred 100; Railway Spring common 59½; Republic common 33¾, preferred 104; Sloss-Sheffield common 88¾; Tennessee Coal 140; Cast Iron Pipe common 44⅝, preferred 93; United States Steel common 38, preferred 104⅞.

Harbison-Walker Refractories Company.—The annual statement of this company, located at Pittsburgh and manufacturer of fire brick for all purposes, shows for the fiscal year ending September 30, 1905, net profits, after the deduction of $204,880.39 for repairs and maintenance, of $1,169,989.97. From this amount there is charged off for extraordinary expenditures, depreciation of mining and tramroad outfits and depletion of clay, coal and gannister properties, $88,961.55. The full dividend for the year is also charged off, though only 4 per cent. of this has been paid, leaving a surplus of $350,215.50, from which amount $175,000 has been expended for the purchase and cancellation of bonds. Referring to the charging off of 2 per cent. dividend that is not yet paid, it is said that while the dividend is not a liability until declared the charging off has been done because of conservative ideas as to bookkeeping. The balance sheet is as follows:

Assets.

Property account		$28,735,956
Betterments, completed		288,704
Betterments, incomplete		439,095
Deferred charges to future operations		409,206
Current assets:		
Inventories	$1,003,505	
Cash	547,905	
Accounts receivable	1,101,494	
Bills receivable	21,021	
		2,673,928
Total		$32,546,890

Liabilities.

Capital stock—Preferred		$9,600,000
Common		18,000,000
Bonds, total issue	$3,500,000	
Less purchased and canceled	535,000	
		2,965,000
Purchase money mortgage		40,000
Reserves:		
Bond interest and tax	80,312	
Reserve to cover premium at redemption of bonds	36,885	
Properties' depletion	52,754	
Deferred dividend on preferred stock	240,000	
		409,952
Current liabilities:		
Accounts payable	231,548	
Pay rolls	62,248	
		293,797
Surplus:		
As at September 30, 1904	887,925	
Surplus for year	350,215	
		1,238,141
Total		$32,546,890

Following is a comparative statement of the earnings of the Sloss-Sheffield Steel & Iron Company for fiscal years ending November 30:

	1905.	1904.	1903.
Profits from operation	$1,606,515	$910,435	$1,853,534
Interest and taxes	240,000	240,000	240,000
Surplus	$1,366,515	$670,435	$1,613,534
Preferred dividend	456,000	456,000	456,000
Surplus	$910,515	$214,435	$1,157,534

Dividends.—Westinghouse Air Brake Company has declared a regular quarterly dividend of 2½ per cent. and an extra dividend of 2½ per cent., both payable January 10.

Empire Steel & Iron Company has declared a semi-annual dividend of 1½ per cent., payable January 1.

Westinghouse Machine Company has declared the regular quarterly dividend of 2½ per cent., payable January 10.

American Ship Building Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable January 15.

North Penn Iron Company, North Penn Junction, Philadelphia, has declared a quarterly dividend of 2 per cent. on the capital stock, to be paid January 2.

Tennessee Coal, Iron & Railroad Company has declared the usual quarterly dividend of 1 per cent. on the common stock, and 2 per cent. on the preferred, payable February 1.

Sloss-Sheffield Steel & Iron Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock.

International Nickel Company has declared its first dividend of 1½ per cent. on the preferred stock. The preferred stock is entitled to 6 per cent. annual dividends. The directors have amended the by-laws so as to provide that dividends on the preferred stock shall be payable February 1 and at regular intervals of three months.

New York Pig Iron Warrant Market.

The sales in the New York Pig Iron Warrant Market at the Produce Exchange during the week ending at noon Wednesday were lighter than they have been for many weeks. The total transactions amounted to but 300 tons, as follows: 100 January regular, $16.60; 100 January regular, $16.60, and 100 December foundry $16.75. The following prices were established on call at noon Wednesday:

	Regular.		Foundry.	
	Bid.	Asked.	Bid.	Asked.
Cash	$16.50	$17.25	$16.60	$17.25
December	16.50	17.00	16.60	17.25
January	16.50	17.10	16.75	17.25
February	16.75	17.25	16.85	17.25
March	16.75	....	16.80	17.30
April	....	17.25	16.80	17.30
May	16.60	17.30	16.80	17.30
June	....	17.30	....	17.40

PERSONAL.

E. J. Slayback has been elected a director of the Carbon Steel Company, Pittsburgh, succeeding Archibald B. McGrew.

Thomas E. Davey, secretary of the Finished Steel Company, Youngstown, Ohio, has resigned. He had been secretary from its organization, in 1895. W. J. Fitzsimons, general manager, has assumed the duties formerly performed by Mr. Davey.

A. Emrie has resigned as superintendent of the Allis-Chalmers Company's Milwaukee works and A. M. Mattice has resigned the position of assistant superintendent.

A. B. Conover, for many years Western representative and general sales agent of John A. Roebling's Sons Company, has been made treasurer and general manager of the Chicago office, succeeding the late George C. Bailey.

Andrew Carnegie gave the fourth annual dinner of the Carnegie Veterans' Association at his home, at Fifth avenue and Ninety-first street, New York, Friday evening, December 15. Mr. Carnegie was elected president of the association for the fourth time; Charles M. Schwab was elected vice-president and Charles L. Taylor was re-elected secretary. Mr. Carnegie was given an engraved volume containing the portrait, biography and autograph of every member of the association. The following were present: Charles M. Schwab, W. E. Corey, A. C. Dinkey, H. P. Bope, James Gayley, Thomas Morrison, W. L. Abbott, W. W. Blackburn, L. T. Brown, C. W. Baker, W. R. Balsinger, A. C. Case, J. J. Campbell, D. M. Clemson, W. B. Dickson, R. A. Franks, J. O. Hoffman, A. R. Hunt, D. G. Kerr, George Lauder, H. J. Lindsay, W. C. McCausland, C. E. McCague, John McLeod, A. Monell, G. D. Packer, A. R. Peacock, Lawrence C. Phipps, J. H. Reed, J. E. Schwab, James Scott, C. L. Taylor, H. E. Tener, E. H. Utley, G. H. Wightman and E. F. Wood. Regrets were sent by Thomas Lynch, president of the H. C. Frick Coke Company; John C. Fleming, J. G. Hunter, J. A. Potter, William P. Palmer, W. H. Singer, Millard Hunsiker, P. T. Berg, Edwin S. Mills and John G. A. Leishman, Minister to Turkey.

W. S. Roberts has been appointed superintendent of the plant of the Shenango Iron & Steel Company, Wheatland, Pa., maker of refined iron, instead of John Roberts, as stated.

A. S. Dwight, general manager of the Greene Consolidated Copper Company, Cananea, Sonora, Mex., and Harvey Kirk, assistant superintendent of mines there, are in Duluth and on the Lake Superior ranges this week.

Dr. Henry S. Pritchett, for the past five years president of the Massachusetts Institute of Technology, Boston, Mass., has tendered his resignation. His reason for resigning is that he may devote all his time to the Carnegie Foundation, of whose Board of Trustees he is president. The Foundation's endowment is for $10,000,000, the gift of Andrew Carnegie, whose purpose was to make it the nucleus of a great educational pension fund.

R. B. Dunsmore, formerly Western manager of the S. A. Woods Machine Company, builder of wood working machinery, Boston, Mass., has retired from the service of that company to enter another field. Joel Bernice Ettinger is now Western manager, and the offices are still located at 811 Railway Exchange Building, Chicago.

Harry Bonnell, for some years connected with the shafting department of the Republic Iron & Steel Company, Youngstown, Ohio, has resigned, effective January 1.

T. W. Robinson, general manager of the Illinois Steel Company, was at Duluth and adjacent points the past week.

W. L. Cheney recently returned from a European trip in the interest of the Lucas Machine Tool Company, Cleveland, Ohio.

W. G. La Rue, discoverer of the Baraboo iron district of central Wisconsin, has been visiting at Duluth this week.

William G. Mather, president of the Cleveland-Cliffs Iron Company, Cleveland, Ohio, will sail for Europe early in January and will spend some time in visiting the iron and steel districts of Sweden and Germany.

A. B. Jennings, who was formerly connected with the International Steam Pump Company in charge of its mining pump department, has engaged himself with the Jacksonville Iron Works, Hazleton, Pa., as second vice-president and general manager.

The directors of the Sloss-Sheffield Steel & Iron Company have elected M. M. Richey to succeed Joseph Bryan in the vice-presidency. Mr. Richey is assistant general superintendent of the Southern Railway system, in direct charge of the Western Division. He will make his headquarters in Birmingham, Ala.

OBITUARY.

JOSEPH P. BARNES, vice-president and superintendent of the W. F. & John Barnes Company, Rockford, Ill., died December 10.

GEORGE H. HINKLEY, manager of the sawmill department of the Allis-Chalmers Company, died at Milwaukee December 14, after a brief illness, aged 75 years. Mr. Hinkley organized the sawmill department of the old Edward P. Allis Company 32 years ago and had ever since directed its activities. It was under his administration that the double cutting band saw, which has added more than 40 per cent. to the capacity of sawmills of America, was originated at what are now the Reliance Works of the Allis-Chalmers Company, and many other improvements were either his personal inventions or were made under his supervision. Mr. Hinkley was born in Seneca County, New York.

HENRY F. WEAVER, president of the Weaver Coal & Coke Company, Chicago, and prominent in business and philanthropic circles, died suddenly from apoplexy December 17. He was born in Cambria, N. Y., in 1854.

WILLIAM G. WHITELEY, manager of the mills of the McCullough Iron Company at Wilmington, Del., died in that city December 14, aged 51 years. He was a brother of Henry Whiteley, the president of the company, and had been connected with the works for nearly 30 years, having been general manager for the past ten years.

HERMAN HAUPT, a distinguished civil engineer, died suddenly December 14 on a Pennsylvania Railroad train between Jersey City and Newark from heart disease. General Haupt was a veteran of the Civil War and at the time of his death was the oldest graduate of the West Point Military Academy, having been graduated in 1835. He was born in Philadelphia in 1817. He was general superintendent of the Pennsylvania Railroad from 1849 to 1852. Later he became chief engineer of the system. After the war he served as general manager of the Piedmont Air Line Railroad, chief engineer of the Pennsylvania Transportation Company and Seaboard Pipe Line, general manager of the Northern Pacific and president of the Dakota & Great Southern Railroad.

ISRAEL MORRIS, who in 1829 founded the business now conducted by Morris, Wheeler & Co., iron and steel merchants, Philadelphia, died in that city December 13, aged 95 years. He was born in Philadelphia and was the last of six brothers, one of whom, Stephen, was the senior partner in the old firm of Morris, Tasker & Co., manufacturers of wrought iron pipe, while two other brothers, Henry and Wistar, were also members of that firm. He retired from active business in 1860, but served as a director of a number of financial enterprises and was identified with many philanthropic institutions. He is survived by three sons—Theodore, Frederick and William—all of whom are connected with Morris, Wheeler & Co., and one daughter.

WILLIAM H. DAVENPORT, the founder of the W. H. Davenport Firearms Company, Norwich, Conn., died December 12, from pneumonia, aged 78 years. He is survived by a widow and son, W. C. Davenport.

The Machinery Trade.

NEW YORK, December 20, 1905.

Several large lists and some inquiries involving extensive requirements are at the point of being sent to the trade for bids, and it is safe to say that the year will be rounded out with a large amount of business in the way of prospective contracts. Prices on all classes of machinery have gone up within the last two months, and manufacturers of all classes of tools are constantly notifying their agents to extend their time on promises of delivery. On some machines deliveries cannot be made until November, 1906.

The demand for ore and coal handling machinery has greatly increased of late, especially in the lake districts, where a number of new plants have been installed. The grab bucket system is being used extensively and, notwithstanding the fact that manufacturers of this class of machinery have been deprived of some foreign trade by the invasion of German manufacturers who have gone into the business during the past four years, sales are larger than they have ever been before. Manufacturers have some trouble in getting structural steel and other supplies used in constructing their ore and coal handling plants and are unable to complete their orders as rapidly as they would wish to on that account.

Following in the line of manufacturers of machinery in the advancement of prices the manufacturers of steam specialties, and in fact about all classes of brass goods, are asking higher prices. The advance in prices, however, is not due to abnormally large business, but due to the advance in the price of copper, which so largely enters into the manufacture of brass. We understand that the manufacturers are not making a certain rate of advance and in fact cannot, as the price of copper has been steadily advancing and no one can anticipate the price that will have to be paid. Prices on brass goods will probably fluctuate in accord with the copper market.

Machine Tool Builders' Association Notes.

At the meeting of the National Machine Tool Builders' Association some weeks ago the boring mill manufacturers who are members of the association decided upon an advance in prices of 5 per cent. On December 13, as stated on page 1681 of this issue, a meeting of the Boring Mill Section of the association, which was also attended by manufacturers who are not members, was held in Buffalo, N. Y., and those manufacturers who are outside of the association agreed to advance their prices 5 per cent., conforming with the advance made by the members of the association. The meeting was of unusual importance in that it brought practically all of the boring mill manufacturers into complete harmony and tended to unite more firmly that section of machine tool builders. As a result many who are not members will no doubt join the association, making a strong and important contingent.

President E. M. Woodward of the National Machine Tool Builders' Association has sent to the planer builders a call which is in the nature of a letter giving the vote of the planer section at the last meeting of the association, which was that the prices of various makes, sizes and weights of planers be tabulated, and calling for the data which will be necessary in preparing such tabulation. As soon as replies are received President Woodward will prepare the table and send a copy to each member, after which a meeting of the planer section will be called for the consideration of these matters, as well as prices on various planer attachments, such as variable speed devices, side head, head on rail and the application of electric motor.

The builders of upright drills who are members of the National Association have agreed to advance prices on the same basis as radial drills as decided at the special meeting of the association. The advance is commensurate with the added cost of labor.

Railroad Requirements.

The Philadelphia & Reading Railroad has an extensive list of machinery requirements in course of preparation which is being sent to the trade in small sections. It will be some days, however, before the complete list will be ready for distribution. It is thought that the list will cover nearly all of its next year's purchases and will mean an expenditure of a large amount of money. It is said to be one of the largest ever issued by the road, and it is understood that the company will order early so as to get its deliveries. A number of railroads have had considerable trouble in getting important deliveries of late, and it is probable that other roads will issue their lists and make their purchases very early next year.

With the approach of the new year and the expiration by time limit of appropriations made for 1905 the quantity of equipment in the way of tools and machinery which the Pennsylvania Railroad Company is making through the purchasing agent is limited, and the appended list, which includes superstructures for repairs and improvements, is all that is active at this time: Superstructure, bridge, one span, Templeton Station; superstructure, bridge, one span, 0.8 mile south of Templeton, Pa.; one 48-inch sander; one bulldozer, with 30-inch movement of cross head, to be driven by a 50 horse-power 60-cycle two-phase 220-volt Westinghouse motor, with starter; one double head axle lathe; superstructure, bridge No. 7, wire mill draw, 0.3 mile south of Trenton freight station; one simple high speed automatic cut off self oiling engine, either of the horizontal center crank or vertical type, arranged for direct connection to a Westinghouse 90-kw. separately excited alternating current generator.

Some little machinery is desired by the East Broad Top Railway Company, whose office of president and general manager is in Orbisonia, Pa. The company is now in the market for a single head wheel lathe with about 72-inch face plate, horizontal boring machine, 30-inch lathe and 10-foot planer.

Plans have been completed for the improvements to be made by the Duluth & Iron Range Railroad Company at Two Harbors, Minn., at a cost of about 500,000. A new tank shop, 80 x 144 feet, will be erected, which will have four tracks and be equipped with two 20-ton traveling cranes and other modern machinery for the work required. The tank work is now done in the roundhouse, but this space is required for the engines. There is to be an addition to the machine shops 95 x 103 feet in which will be installed a 200-ton overhead traveling crane which will easily transfer the largest locomotives from one part of the shop to the other. The boiler and blacksmith shops will be extended 58 feet, and a new power house will be constructed between the present shop yard and No. 1 iron ore docks. The power house will be of 900 horse-power capacity and will supply electricity for operating the machinery in the shops and the new coal dock as well as for lighting the various buildings and the five ore docks. A large transfer table will be provided for the workshops recently built. H. S. Bryan is superintendent of motive power.

The Wabash-Pittsburgh Terminal Railway Company and the Wheeling & Lake Erie Railroad Company are receiving bids for the installation and construction of ore handling machinery, a car dumper and about 6 miles of siding for the improvement of the Huron, Ohio, ore docks and the yard of the Wabash Company. Work will be begun shortly in preparing the site for the plant, and it is expected that it will be completed early this spring. The ore handling machinery requirements are extensive.

The Mexican Central Railroad has been purchasing considerable machinery of late for its system. The buying is done from the company's New York offices, at 25 Broad street.

The Cuba Eastern Railroad Company, which at present operates some 50 miles of road in the Province of Santiago de Cuba, is about to extend its operations by the construction of a line for a similar distance with a view to opening up a rich sugar district at present without any railroad facilities. Contracts for rails, &c., are pending and substantial orders will be placed in the near future for sugar machinery, &c. The line at present working extends from Guantanamo to Concepcion Cita, where an affiliated concern, the Cuba Hardwood Company, owns extensive timber lands. The new road will run in a westerly direction from San Pre, located on the existing road about 25 miles north of Guantanamo, right through La Maya Valley, said to be one of the most fertile on the island. The western terminus will be San Luis. Eighty-pound rails are to be laid. Contracts for some 2000 tons of bridge material, it is expected, will be awarded within 60 days. About 80 box cars of 60,000 pounds capacity each and seven passenger coaches will also be required, as well as two 45-ton Mogul locomotives and a 30-ton switching engine. According to Vice-President Lewis of the company, who has just returned from Cuba, fully $5,000,000 will be expended within the next 12 months in the construction and equipment of sugar factories, coffee machinery, &c., along the new route. Three *centrales* are to be built, each having a capacity of 1000 tons of cane daily. About 30 miles of narrow gauge tramways will be constructed for transporting the cane to the mills. The new road, it is anticipated, will be built inside of three months, the grading having already been completed.

The Cuba Eastern Railroad Company's president is H. W. Bennett. Among those interested in the project are Charles T. Barney, F. L. Eldridge, H. Feuchtwanger, H. P. Goldschmidt, F. L. Lisman of New York; Eben T. Draper of Hopedale, Mass.; Henry M. Whitney, Albert S. Bigelow and Benjamin P. Cheney of Boston. S. L. Barger of the International Silver Company, and John T. Christie of the Ludlow Valve Company are also interested. A. V. Sims is general manager and chief engineer of the company. His headquarters are in Cuba. The New York offices of the company are in the Orient Building, Wall and Beaver streets. Mr. De Zayas is the purchasing agent.

Important Machinery Rquirements.

The Otis Elevator Company, 17 Battery place, New York, has purchased a tract of 35 acres of land at Buffalo on

the New York Central Belt Line tracks, which will be used as a site for a new plant. The company will shortly begin the erection of a large factory for the manufacture of elevators and plans are being prepared in a preliminary way. The company has not decided yet as to the size of the structure, but it is understood that it will be as large as, if not larger than, any of the existing plants. Considerable machinery has been purchased of late by the company for the addition to its plant at Yonkers, and that section will be in operation within a month. Even with these improved facilities for getting out its orders the company will be rushed with work, and there will probably be little delay in beginning the new Buffalo plant.

Work on the new open hearth steel plant and rolling mill to be erected on Staten Island by Milliken Brothers, 11 Broadway, New York, has already been begun and the grading and excavating have progressed to a considerable extent. Some of the material for the plant has begun to arrive, and the contract for the rails for the tracks, amounting to 800 tons, has been placed with the Pennsylvania Steel Company, while the ties for the tracks have been delivered. The Pennsylvania Steel Company has received the order for the switches, and five yard locomotives have been ordered from the H. K. Porter Company. The contracts for the 40-inch blooming mill, the 30-inch roughing mill and the 28-inch finishing mill have been placed with McIntosh, Hemphill & Co., of Pittsburgh. Most of the other more important contracts connected with the project have been given, and last week, it is understood, contracts for a number of large cranes and similar apparatus were given out. It is said in the trade that the machine tools and other minor requirements have not been arranged for as yet, but the work of closing out the orders is being rapidly pushed forward and it is thought that most of the requirements will be contracted for before the year is out.

Among the large purchasers of the past few weeks was the Bethlehem Steel Corporation, South Bethlehem, Pa., which has now about completed the buying of the tools specified in its list, which was sent out some time ago. The purchases of the company extended along for several weeks—in fact, since shortly after the middle of November—and are said to cover machinery to the value of over $100,000. Philadelphia and New York houses are understood to have captured most of the business.

The E. W. Bliss Company, Brooklyn, N. Y., has been purchasing large quantities of machinery during the past few weeks to replace old tools. The company is renewing a good deal of its equipment to bring it more up to date, and will likely continue in the market for some time.

The New York office of the Case Mfg. Company, 85 Liberty street, has secured orders for a 75-ton electric crane with a 10-ton auxiliary hoist, 53 feet span and 85 feet lift, for the Waterside Station of the New York Edison Company. The Edison Electric Illuminating Company of Brooklyn has ordered a 50-ton electric crane, with a span of 72 feet, and the General Electric Company, Schenectady, N. Y., has ordered a 50-ton electric crane with a 10-ton auxiliary, with 44 feet span, from the same company.

E. D. Cleghorn, general manager of the Acme Lathe & Products, Limited, Manchester, England, is now in this country to complete negotiations for the placing of its products on the market in the United States. The company makes the Simplex four-spindle automatic screw machine.

Arrangements are being made by the McKerahan Automatic Car Coupler Company, Wilmerding, Pa., for the erection of a plant for the manufacture of its car coupler. The company, which was only recently organized, has not yet selected a location for its foundry, nor has the exact size been determined. The plant will be erected within a radius of 20 miles of Pittsburgh and will consist of a steel foundry about 50 x 150 feet. C. A. McKerahan is president; William McDwett, treasurer, and W. W. Brush, secretary.

The Glazier Stove Company, Chelsea, Mich., is arranging to add a steel range department to its plant, which it intends to equip with the most up to date machinery for making, mounting and handling that class of goods economically. The company will require considerable machinery for this department and would like to hear from manufacturers who make a specialty of the manufacture of tools and machines designed specially for this class of work.

Contracts will be awarded within the next few weeks for the construction and equipment of a large pier and custom house, &c., to be built in Havana. The carrying out of the work will result in the expenditure of upward of $3,000,000 and the purchase of large quantities of steel, electrical equipment and other machinery in the States. The concession has been let to a syndicate of Americans, of which Edward Lee Conant, a prominent attorney, with headquarters in Havana and New York address at 32 Liberty street, room 1203, is the nominal president. As to who are the actual parties behind the project no information can be secured at this writing, but it can be stated that the New York contracting firm of MacArthur Bros. & Co., Hanover National Bank Building, intends to bid on the construction contract and that work is expected to be commenced within 60 days. The pier will be about 750 feet long by 650 feet wide. Custom house offices, &c., are to also be built at an estimated cost of some $100,000. The pier is to be elaborately equipped with cranes and other freight handling machinery, all of which will be operated electrically. With up to date American equipment of this description it is claimed a reduction of at least 25 per cent. will be made in the existing ocean freight handling tariff in Havana, where about 750,000 tons were taken care of during the last 12 months.

Power Work.

The Pennsylvania Coal Company, which is controlled by th Erie Railroad, has a list in the market for about $40,000 worth of equipment for a new electric plant, to be built at Old Forge, Pa., in connection with the coal breakers there. The plant will be of about 1200 horse-power, and the machinery is to be bought by the purchasing department of the Erie Railroad.

The Brooklyn Edison Company is overhauling the plant at the foot of Gold street, and two turbine generating sets are to be installed. The company has been buying some other machinery equipment for the plant, which will be thoroughly renovated. Thomas C. Duffy, 360 Pearl street, is the engineer in charge.

The Quito Electric Light & Power Company, recently organized with a New Jersey charter, with a capital of $400,000, will erect a large light and power plant at Quito, Equador. The company has awarded the contract to the London connection of J. G. White & Co., Exchange place, New York. It is also constructing an electric railroad in Quito at a cost of about $1,000,000. It is more than probable that the machinery and other equipments for both the light and power plants and the railroad will be purchased in this country. It is stated in the office of J. G. White & Co. that the work of construction will not begin for some time and no machinery will be bought as yet. Later on, however, the company will in all probability come into the market with a large list.

Business Changes.

A. E. Hoerman, who has been connected with Curtis & Co. Mfg. Company, St. Louis, Mo., as chief engineer, has opened an office at 261 Broadway, New York, as a manufacturers' agent, and will make a specialty of selling pneumatic machinery. He will represent Curtis & Co. Mfg. Company, the Dayton Pneumatic Tool Company, Dayton, Ohio, and F. F. Slocum Company, Wilmington, Del.

Request for Catalogues.—Gustave Voightman, Kaiger, Germany, desires catalogues from manufacturers of molding machines, special machinery for builders of agricultural machinery and implements and novelties in agricultural machines and implements.

Chicago Machinery Market.

CHICAGO, ILL., December 19, 1905.

Advances on practically all lines of machine tools that have not already been made will go into effect on January 1. Local machinery dealers have been advised by manufacturers this week of advances ranging from 5 to 10 per cent., and the entire machine tool market will be on a higher basis with the advent of the new year than it has been for several years. Advances on lathes, radial drills and vertical milling machines average 5 per cent. and on shapers the advances range from 5 to 10 per cent. Planers were advanced some time ago, although no concerted action was taken in making advances on most of the other lines. Grinding machinery as yet remains unchanged and the indications are that no advance will be made. Dealers on Machinery Row report that demand is limited almost entirely to individual tools, no general equipments having been placed during the week. Nor have any railroad lists been issued, and the few that are under negotiation will not be closed until after the first of the year. On account of the inability of the machine tool builders to make any kind of satisfactory deliveries the demand for second-hand machinery continues good and prices prevailing are very satisfactory. By the sale of the equipment of the Board-Crosby Company plant in this city dealers hope to replenish their depleted stocks. The sale was to have taken place last Thursday, but was postponed one week on account of legal technicalities.

The Keller Mfg. Company, Sauk Centre, Minn., is in the market for a hub band welding machine to be operated by electric power, a 50 horse-power natural gas engine, electric motors for individual machines, switchboard equipment, a 150 horse-power marine boiler which will burn slack coal and wood cuttings. The company is also in the market for an up to date wet dry kiln system for drying timber which has been seasoned for two or three years. A full line of improved wagon machinery will also be required.

The U. N. Roberts Company, Davenport, Iowa, will be in the market for wood working machinery for its planing mill and finishing factory about the first of the year.

The Cyclone Drilling Machine Company, Orrville, Ohio, has increased its capital stock from $15,000 to $100,000 and will make extensive enlargements to its plant. The company will be in the market for iron working machinery and ele-

vators and other equipment, but specifications of complete requirements will not be made up until after the first of the year.

The B. F. Barnes Company, Rockford, Ill., recently shipped a carload of miscellaneous tools to tidewater, containing equipment for Australia, France, Japan, Belgium and China.

The Pacific Coast Gypsum Company, Tacoma, Wash., is building a new plaster mill. A part of the machinery equipment has been purchased and a part is now being arranged for. It is probable that electric power will be used, and if so about 200 horse-power in motors will be installed. These have not been arranged for as yet. Two 10-foot calcining kettles and a large sized nipper for preparatory crushing of rock have been purchased of Butterworth & Lowe, Grand Rapids, Mich. The company has not yet fully decided on the pulverizing and grinding machinery, nor have elevators and conveyors been purchased, of which a considerable number will be required. Broughton mixers have been ordered of the Alexander Iron Works, Syracuse, N. Y., and Burr hair pickers of Curtis & Marble, Worcester, Mass. The company will manufacture from gypsum rock shipped from Alaska, where it has been engaged in developing property the past year. Manufacturing operations will begin about May next.

Power and Municipal Work.

The La Crosse Hydro-Electric Light & Power Company, La Crosse, Wis., has been incorporated, with a capital stock of $1,000,000, to erect and maintain a water power plant at Mormon Riffles, near Black River Falls, on Black River. Work will be started at once to build a water power plant which will develop a minimum of 12,000 horse-power. Plans call for the immediate expenditure of $750,000 and a probable increased expenditure of $500,000. Power will be transmitted to La Crosse, a distance of 55 miles; to Winona and to other cities and towns within a radius of 100 miles. It is probable that the entire construction work will be let to one firm of contractors, who will also be authorized to make all purchases of equipment. There are interested in the enterprise Col. Orlando Holway, E. G. Boynton and Roy Bingham, all of La Crosse.

The city of Fort Wayne, Ind., will receive bids until December 21 on the following equipment for its water works system: A high duty pumping engine of 10,000,000 gallons daily capacity, auxiliary pumping engine of 6,000,000 gallons daily capacity, vertical shaft centrifugal pump, with electric motor, of 2000 gallons per minute capacity; two 150 horse-power boilers and two automatic stokers for same, a deep well pump, feed water heater and purifier, cast iron pipe, valves and other accessories.

The Mount Theresa Gold Mining Company, of which W. E. Garver, Idaho Springs, Col., is manager, will soon be in the market for a complete mining plant. A water power plant will be erected on Soda Creek, near Squirrel Gulch, Col., to generate electric power or to operate a compressed air plant to run hoist and drills.

The city of Lincoln, Neb., will receive bids until January 15 for furnishing a high duty pumping engine.

The Commissioner of Public Works of the city of Chicago will receive sealed proposals until December 29 for furnishing and erecting at the Sixty-eighth street pumping station four horizontal water tube boilers, fitted with chain grate stokers.

Philadelphia Machinery Market.

PHILADELPHIA, PA., December 19, 1905.

More business was transacted in the local machinery market during the past week than was generally thought would be the case. As a rule the advent of the Christmas holidays, together with the approach of the end of the year, has a tendency to defer placement of orders to a considerable extent, and while there was an appreciable falling off in the demand for some lines of tools a very satisfactory business was transacted in others. The fact that business in some cases has kept up so well during the month has been attributed in most cases to the covering of orders which under ordinary circumstances would not have been placed until January, to forestall any actual or probable advance in prices after the first of the year.

The most important event of the week was the closing of contracts for the equipment of the new machine shop, known as No. 4, by the Bethlehem Steel Corporation, mention of which has previously been made in these columns. A number of local manufacturers and merchants obtained a good share of this business, the receipt of which aided materially in the total volume closed so far during the present month.

Manufacturers of all classes of tools are exceptionally busy. In some cases record outputs are being made and every department of the various plants is being operated to its full capacity. There would be no cause for anxiety, generally speaking, on the part of the trade if there was a let up in the demand for the next week or so. Builders have sufficient business on their books to keep them actively engaged well into the coming year, and a short respite would enable the makers of tools and machinery to catch up the loose ends and be thereby the better enabled to handle the business at the beginning of the new year. Inquiries, however, continue to be received in good quantity, most of which are confined to small lots of tools, or in many instances to single tools for replacement or extension. There are no inquiries for large equipment before the trade at the present time. Deliveries are continually hardening. Manufacturers have been unable to make anything like good delivery for some months, and the increased volume of business, together with the delays in obtaining promptly supplies of raw materials, has made further extensions in time of delivery imperative.

The demand for the smaller engines, boilers and second-hand machinery is not as active as manufacturers and dealers would like. For some months trade in these lines has dragged, and while some good business has been done at times, buying on the whole has been rather spotty.

The foreign trade remains inactive. At the close of the year it is not infrequently the case that this branch of the trade drags considerably, particularly in the specialties. New business has been light and no specifications requiring any extensive equipment are being figured on at the time. Some improvement in this trade is anticipated, but at present manufacturers have as a rule more domestic business than they can conveniently take care of.

Castings, both iron and steel, continue in good demand. The labor situation in the gray iron foundries is said to be improved. All the foundries affected by the recent strike of core makers and molders are in operation, some, however, being still badly handicapped and unable to get their work out promptly. Steel casting plants continue to book orders for a large tonnage and have all the work they can handle. Customers complain of deliveries, but the foundries are doing all they can to get work out promptly.

The Columbia Graphite Company, with mines and works at Gablestown, Pa., and offices in the Real Estate Trust Building, this city, contemplates re-equipping its plant with new machinery for the preparation of graphite for the market and also making a number of additions in the line of mining machinery.

A company has recently been formed in Allentown, Pa., for the manufacture of a new auto truck. E. A. Kraus is president; Lawrence Nadig, vice-president, and Charles H. Nadig, secretary and treasurer. The company has not yet fully decided on its plans.

The Platt Iron Works Company, successor to the Stillwell-Bierce & Smith-Vaile Company, Dayton, Ohio, manufacturer of steam and power pumps, air compressors, heaters, &c., will move its local office from 617-619 Arch street, this city, to the Commonwealth Building, Twelfth and Chestnut streets. Floor space will be retained at the former location, however, for the display of various lines of machinery.

Frank W. Dilks, representative in this territory for the Ludlow Gate Valve Company, Troy, N. Y., has moved his office from 535 Arch street to 1309 Arch street. The warerooms at the former location will be discontinued after December 31.

Dienelt & Eisenhardt, Incorporated, note a heavy demand for hydraulic jacks ranging from 10 to 60 tons capacity, more particularly for those of 30 and 40 tons caapcity, of which a large number have been sold. Orders for dead stroke hammers have improved and several are now being constructed for various customers. Their electrical department is busy on a line of Monarch generators and motors, while the machine department has a large volume of general work on hand.

The Philadelphia Roll & Machine Company continues very busy. The demand for sand cast and chilled rolls is the largest the company has ever experienced and orders for a number, particularly of the heavier type, weighing from 10 to 12 tons each, have been received. An order for a complete 26-inch sheet mill was also recently booked, as have also been orders for a number of charcoal iron castings. This company is melting well over 1,000,000 pounds of charcoal pig iron per month and is shipping rolls to various iron and steel plants in different parts of the country.

The Espen-Lucas Machine Works reports business in excellent shape for the season. A number of orders have been taken recently, particularly for the heavier types of bar, steel foundry and forge cold saw cutting off machines, horizontal floor boring machines and crank shaft forming machines. Considerable difficulty has been experienced in making deliveries, owing to the inability of foundries to supply castings, but as these are now coming forward more promptly no further delays are expected from that source. This company has made a number of shipments of tools recently, including three steel foundry saws for Southern delivery, a crank shaft forming machine and several steel foundry saws for the Middle West.

There is practically no ferromanganese in the market for delivery in the first quarter of 1906. Sales have been made recently by New York importers for April delivery at $100 and as high as $125 has been paid for ferro for delivery in the early part of 1906.

Cincinnati Machinery Market.

CINCINNATI, OHIO, December 19, 1905.

The volume of business that is being taken care of is probably as large as it has been at any time during the past six months, and any depressing effect that might be attributed to the holiday season has not as yet made itself felt. While it is perhaps true that new orders show a slight decrease in the way of numbers, it is reasonably certain that a large percentage of tool builders have sufficient work under contract to carry them far into the coming year. Foreign trade still continues active and large shipments of tools are forwarded almost every week to points abroad. The demand is such that several of the larger makers have advanced the prices of their tools, claiming that with material and labor at such figures it was absolutely necessary to make an advance in prices or lose money.

Secretary Finch of the Industrial Bureau states that the last preliminary steps were taken on the 15th inst. in the formation of the new Steel Foundry Company. At the stockholders' meeting at which the organization was effected the books showed that the capitalization of $100,000 had been considerably oversubscribed and applications for the stock were received even after the meeting had adjourned. The stockholders organized by electing the following directors: William Lodge, Franklin Alter, J. C. Hobart, J. F. Ellison and William H. Stewart. These directors elected the following officers: William Lodge, president; Franklin Alter, vice-president; J. C. Hobart, treasurer, and William H. Stewart, secretary. C. G. Robinson, until recently with the American Steel Foundries, was elected general manager. Mr. Robinson has been in the steel castings business ever since receiving his diploma as an engineer and is thoroughly familiar with all the phases of the business, not only having practical and technical knowledge of the manufacturing, but is also experienced in the selling department. The papers were signed for the purchase of what is known as the Abbey property, adjoining the Winton place car shops, which places the plant in close touch with the manufacturing district in that section of the city. The contracts were let to the Schlieper Mfg. Company for all the buildings, equipment, electric light plant, electric cranes, furnaces, machinery, &c. The subcontracts have not as yet been let and considerable new machinery is to be purchased. The main building, constructed entirely of steel, will be 135 x 260 feet. The administration and power, pattern room and pattern storage building will be 30 x 140 feet, two stories in hight. A provision of the contract is that the buildings shall be completed, furnaces and machinery installed and the contractors make the first heat and pour the first batch of steel within four months of date, or by April 15, 1906. The entire plant will be constructed along the most modern lines and the very latest machinery and equipment will be used. The company already has customers anxious to sign for the year's product of castings.

The R. K. LeBlond Machine Tool Company reports that it is selling more tools than it is able to build each month, consequently deliveries are getting farther off. Export business has been very satisfactory, the company having secured several very large orders from England and Germany. Domestic trade is also excellent and a strong business is anticipated for the coming year.

The John Steptoe Shaper Company has commenced to run its plant overtime. Owing to the exceptional demand for its tools all orders are cut down so that only two or three machines are sent to any one party. It has more orders booked at the present time than at any other period during the history of the firm. Shipments have been made to foreign points as follows: Five machines to Stockholm, seven to London, three to Milan, two to South America, one to the United States Naval Station at Cavite, P. I.; one to Central America, three to Antwerp. There is an exceptional demand for machine tools in this city and it is necessary to work at night to meet it.

The J. M. Robinson Mfg. Company is now fairly well settled in its new home on Spring Grove avenue, between Monmouth and Sassafras streets, this city. The new plant has a frontage of 65 feet, running back 200 feet. This building is two stories in front, extending back 40 feet, the second story being occupied as a pattern shop and drafting room, with the lower floor devoted entirely to the machine shop. The building is open through the center, through which a traveling crane runs the entire length of the building. Another building 40 x 75 feet is now under construction, located in the rear of the main building, which will be utilized as a storeroom for patterns as well as for punching and stamping. A large number of orders are booked, including nine large presses, weighing about 15,000 pounds, for making corrugated iron; also two large 10-foot brakes for working ¼-inch plates, weighing about 34,000 pounds each. The plant is being run overtime at present and will continue to do so until it is able to catch up on orders. Since moving to the present location the capacity of the plant has been doubled and yet it is unable to keep pace with new work. The foreign demand, especially with England and Mexico, is brisk.

The Cincinnati Machine Tool Company now has all its new machinery placed, which enables it to make much better deliveries than formerly. Orders are coming from all parts of this country as well as from European points. A good run of business is reported and at the present time it has been found necessary to work at night to make required deliveries.

The Sebastian Lathe Company reports the year just closing to have been an exceptionally good one. Full force full time has been worked during the entire period and prospects for the coming year are excellent. Orders, both foreign and domestic, have come forward very freely and an increase in this direction is noted. It finds that the increase in labor and material is cutting into margins very perceptibly and arrangements are now being made to advance the prices on all its tools beginning with the new year.

The Cincinnati Planer Company reports that it has taken more business during the past three months than for any similar period during its history. To take care of this increased volume of business it is increasing the capacity of the plant as much as possible and to this end is now converting what was formerly used as a warehouse, a building 50 x 150 feet, into a machine shop. Here will be manufactured its smaller size planers, 24 to 30 inches, inclusive. It recently placed orders for a lot of additional machinery, some of which has already been delivered and is now running. The outlook for next year is said to be good, and while it has advanced prices on its tools, this seems to have had no effect on the amount of business received, which is a good indication of a healthy condition of trade. Foreign trade has also largely increased during the year, among which we note orders from Mexico, South America, Japan, Italy, Germany, Switzerland and England.

New England Machinery Market.

WORCESTER, MASS., December 19, 1905.

The near approach of the holidays, coupled with the fact that inventory taking is at hand, has had its effect upon the demand for machine tools and the dealers are not so busy as they have been, according to the general statement. The new year should bring with it a revival of the same insistent trade that has characterized the past few months. Prices have materially stiffened since the National Machine Tool Builders' Association held its special meeting, the members and also others in similar lines having responded to the action of the several sections in advancing prices.

The Boston Automobile Show, which will be held in the Mechanics' Buildings the week of March 10, is attracting considerable attention among machinery dealers and manufacturers, and the indications are that a good many tools will be shown, including standard lines as well as machinery designed for special work in connection with the manufacture of automobiles. The automobile builder has become a very important customer of the machine tool men. This year is no exception to the rule and large orders are in sight, it is said, in connection with new companies and enlargements by existing concerns. Consequently the dealers and manufacturers see in the automobile show an excellent opportunity to display their machines. Exhibition space is already at a premium.

The Shaw Machinery Company, Lowell, Mass., manufacturer of textile machinery, is occupying its great machine shop recently completed. The new foundry will not be built until spring.

The W. T. C. Macallen Company, 338 Congress street, Boston, is to erect new factory buildings at Division and Foundry streets, South Boston. The two main buildings will be six stories in hight, one 66 x 130 feet, the other about 57 x 152 feet. In the rear will be a fire room, 24 x 48 feet. The buildings will be of heavy mill construction. Two 150 horse-power tubular boilers and a 250 horse-power Harris-Corliss engine will be installed. The improvements include an artesian well, 400 feet deep, to provide an ample supply of water for the presses. The company manufactures electric railway supplies, insulating joints and electrical specialties, and the product will be generally the same as that of the past 15 years. The present quarters on Congress street and on West Second street, the latter a foundry and storehouse, have been outgrown.

The Marston Rake Company, Lebanon, N. H., whose factory was recently burned, is occupying another building and proposes to erect a new building in the spring. The company manufactures drag rakes, safety shingling brackets and snow shovels.

The National Spring Bed Company, New Britain, Conn., is to erect a new factory building, 43 x 85 feet and five stories, including basement. The building will be devoted to manufacturing spring beds and fabrics. The company states that it will be in the market for a new engine, boiler, some presses and the necessary shafting, pulleys and couplings to extend its lines from the present building.

The Albert Russell & Sons Company, Newburyport, Mass., manufacturer of pumps, power capstans, winches, &c., is contemplating the erecting of a modern iron foundry of brick and steel construction which will be equipped with up to date foundry machinery. It is settled that the foundry will be built, but the directors are considering the question of locating elsewhere than Newburyport, in spite of the recent purchase of available land adjoining the plant. Several propositions have been made the company to locate in other cities, both within and out of Massachusetts, and one such proposition seems very advantageous. Another reason for the desirability of changing the location lies in the fact that the available land, which is 76 x 136 feet, would probably not provide a building sufficiently large for its purpose, the business being constantly increasing in volume. Arbitrary freight rates to billing points is still another argument against the present location. The matter will not be decided until the company is over its present rush of orders.

The Hine Box & Printing Company, Danbury, Conn., a new Connecticut corporation, which will manufacture wood, board and paper boxes, states that it will probably be in the market for a boiler and engine in the spring. The incorporators are Frederick A. Hine, Eugene C. Harrison, Eugene W. Boughton and John F. Lynch.

Wilson & Smith, manufacturers of metal stamping and die work, Worcester, Mass., are occupying their new building at East Worcester, which gives them double their former manufacturing facilities. The building is of brick, two stories and 50 x 100 feet. The firm quite recently purchased the business of the Worcester Polishing & Nickel Plating Company, which, combined with their own department for the same line of work, gives them one of the best equipped polishing and plating plants in the city. During the past year the manufacture of armature disks has been added to their regular line of press and die work, most of which is done on contract. A feature of the new factory will be its source of power, consisting of a Westinghouse gas producer, by which gas will be procured from anthracite coal to operate a Westinghouse double cylinder engine and in furnaces for tempering and hardening.

The Stanley-G. I. Electric Mfg. Company, Pittsfield, Mass., has purchased a tract of land adjoining its property so that its future requirements in the way of buildings may be provided for. No definite plans for the future have been made, the company states.

The Cameron Company, which has been manufacturing the Cameron motor car in the James Brown shops, Pawtucket, R. I., announces that it will remove its business to Norfolk, Va., the first of the year and will continue manufacturing in that city. An existing factory will be occupied for a few months while a new and large plant is building, which will be ready for occupancy in the spring.

H. G. Barr, Worcester, Mass., has received large orders for drill presses of late. Two seven-spindle machines of ½-inch drilling capacity have been purchased by the Adder Machine Company, Detroit, which is in addition to three machines of the same capacity previously delivered. A recent Russian order was for 24 single spindle machines. The Remington Arms Company has ordered two six-spindle, two four-spindle and two three-spindle machines, all power feed. A batch of 25 single spindle drills now on the fioor have all been sold.

Cleveland Machinery Market.

CLEVELAND, OHIO, December 19, 1905.

There is no noticeable let up in the machinery business with the approach of the new year. It is probably a fact that the majority of Cleveland factories are busier than ever before. Nearly all the larger concerns have recently put on night shifts or are working overtime. The prospects for another large increase in the amount of ore produced next season has resulted in a demand for many new ore and fuel handling outfits, and the manufacturers of conveying machinery are especially rushed with work. This same outlook, together with the large number of vessels lost in recent severe storms on the Great Lakes, has caused an unprecedented demand for new vessels and the vessel tonnage contracted for within the past two weeks has been heavier than any similar period in the history of the business. The general demand for machine tools for additional equipments for concerns in this vicinity continues and there are several large orders in sight and being contracted for; large orders have been unusual this fall despite the strong general demand. There seems to be no let up in the number of tools which automobile manufacturers are absorbing and every few days there are reports that this or that automobile shop is increasing its equipment.

The Toledo-Massillon Bridge Company, which is erecting a large plant in Toledo, has circulated lists among local dealers and manufacturers for tools aggregating nearly $200,000, including many large planers, boring mills, drills, punches and shears, riveting machines, compressed air tools, &c. It is understood that these contracts are to be closed up in the near future and the new shop will be completed about the middle of next summer.

The F. B. Stearns Company of this city, manufacturer of gasoline automobiles, has commenced work on a large additional factory building and will install considerable new machinery. It is the intention to build nearly twice as many automobiles as were planned for at the beginning of the manufacturing season.

The Brown Hoisting Machinery Company has closed up a number of important contracts for ore and fuel handling machinery during the past ten days and is now working a night shift to push this work through. Among its large contracts was one for the Republic Iron & Steel Company at Youngstown, including a 7½-ton bridge, large bins, furnace hoists, &c. For the Federal Furnace Company of South Chicago it will build two large bridges, bins and conveying machinery. These two contracts aggregate about $375,000. It is building two furnace hoist outfits for the New Jersey Zinc Company, Hazzard, Pa., and a furnace hoist outfit for the Alabama Consolidated Coal & Iron Company, Birmingham, Ala. This is one of several furnace hoist outfits ordered from the Southern district lately.

The Ajax Mfg. Company, manufacturer of forging and upsetting machines, is building a number of large forging machines for the Pressed Steel Car Company, including two 5-inch, two 3½-inch, three 2½-inch and several smaller machines. This company recently shipped to the Pullman Palace Car Company, Chicago, two 4-inch forging machines and four large bolt headers. It recently shipped a 6-inch forging machine to the American Car & Foundry Company and a similar tool to the Pennsylvania Steel Company, these being the largest machines it builds. The foreign trade is larger than ever before, and it is now building 15 large tools for England, Germany and Russia.

Foot, Burt & Co., manufacturers of multiple drilling machines, are working to their full capacity on large tools. They are building six large multiple machines for the Pressed Steel Car Company, six for the Ralston Steel Car Company, Columbus, and a very large tool for the Cambria Steel Company, Johnstown. They recently shipped two large radial drills to the League Island Navy Yard.

The Lake Shore Electric Railway, Cleveland, will shortly close contracts for a 2000-kw. steam turbine, together with two 500 horse-power boilers, stokers, condensers, pumps, &c., for its Beach Park power station. F. W. Coen is purchasing agent.

The United Brass Mfg. Company is erecting a large factory addition. It recently purchased considerable new brass working machinery and is preparing to contract for a sprinker system to protect its entire plant.

The American Malleable Castings Company, composed of Cleveland people, has succeeded to the plant and business of the Marion Malleable Company, Marion, Ohio. Charles L. LaMarsh of Cleveland will be president and general manager of the company, and J. C. Wallace, president of the American Shipbuilding Company, is heavily interested. P. J. Martin, an experienced producer of malleable castings, will be the mechanical head of the business. The new company took possession of the plant last week and will improve and operate it.

The Cleveland Armature Works, Cleveland, manufacturer of electrical specialties and repair parts, has purchased a building site and is having plans prepared for a new factory building.

The American Pneumatic Wheel Company, Lorain, Ohio, headed by Capt. Richard Thew, is equipping a large machine shop for the production of a spring wheel for automobiles and vehicles. The company will shortly commence operations.

E. L. Barber, Wauseon, Ohio, is the largest stockholder in a company being formed in that place to manufacture compressed air house cleaning outfits and gasoline engines. The company will erect main factory building, 72 x 250 feet, two and one-half stories high, and a foundry, 50 x 75 feet.

Government Purchases.

WASHINGTON, D. C., December 19, 1905.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until January 6 for the construction of a steel caisson at the Charleston Navy Yard, including pump, electric motors, &c.

The Quartermaster, Key West, Fla., will soon call for bids for the installation of a machine shop at Fort Taylor, Fla.

The following bids were opened December 12 for supplies for the navy yards:

Bidder 23. George F. Blake Mfg. Company, New York.
39. C. & C. Electric Company, New York.
44. Drew Machinery Agency, Manchester, N. H.
69. General Electric Company, Schenectady, N. Y.
128. Price & Keene, Philadelphia, Pa.
141. Rockwell Engineering Company, New York.
145. B. F. Sturtevant Company, Hyde Park, Mass.

Schedule No. 233.

Class 31. One induction motor—Bidder 69, $1390; 128, $325.

Schedule No. 247.

Class 121. Four 50-kw. generating sets, with spare parts—Bidder 39, $15,088; 69, $16,060; 145, $16,715.85.

Schedule No. 249.

Class 163. One steam pump—Bidder 23, $55; 44, $58; 141, $275.

Under bids opened December 5 for supplies for the various navy yards the following awards have been made:

Baird Machinery Company, Pittsburgh, Pa., class 13, one pattern and core box machine, $189.95; class 78, one Franklin portable shop crane and hoist, $124.

Detrick & Harvey Machine Company, Baltimore, Md., class 21, one open side extension planer, $6315.

Standard Railway Equipment Company, St. Louis, Mo., class 22, 12 pneumatic drills, $880.

Sherman-Brown-Clements Company, New York, class 23, one portable electric grinder, $96; class 24, one portable radial drill, $190.

Chicago Pneumatic Tool Company, New York, class 25, one portable electric hand or breast drill, $63.75.

Smith-Courtney Company, Richmond, Va., class 26, one portable electric grinder, $37.40; class 30, one scroll saw machine, $72.59.

Handlan-Buck Mfg. Company, St. Louis, Mo., class 27, one cold metal sawing machine, $358; class 28, one cold metal sawing machine, $258; class 29, one cold metal sawing machine, $130.

Niles-Bement-Pond Company, New York, class 31, one 2500-pound steam hammer, $1694.

Fairbanks Company, New York, class 32, one 150-pound power hammer, $725; class 35, one centering machine, $210.

Becker-Brainard Milling Machine Company, Hyde Park, Mass., class 37, one universal milling machine, $550.

The Crocker-Wheeler Company, Ampere, N. J., has been awarded class 91, one electric motor, $359, bids for which were opened November 28.

Under bids opened November 21 for supplies for the various navy yards the Pacific Tool & Supply Company, San Francisco, Cal., has been awarded class 24, one No. 2 die sinking machine, $590, and class 25, one surface grinding machine, $781.

The General Electric Company, Schenectady, N. Y., has been awarded class 101, 48 electrical equipments for delivery at various shipbuilding plants, at its bid of $14,760. Bids were opened October 10.

Trade Publications.

Cranes.— Wellman-Seaver-Morgan Company, Cleveland, Ohio. Section E of catalogue on "Iron and Steel Works Equipment." Size, 9 x 12 inches; pages, 81 to 112. Pertains to cranes, including electric overhead traveling cranes, ladle and hot metal cranes, bucket handling cranes for ore, coal, crushed limestone, sand, gravel and other loose materials; coke handling cranes, gantry and yard cranes, shipyard cranes and locomotive cranes, with or without automatic bucket. Several illustrations show notable equipments, among them installations of Wellman patent double trolley ladle cranes at the Illinois Steel Company's Chicago plant, the Carnegie Steel Company's Sharon works, the Union Steel Company's Donora plant, and the works of Vickers' Sons & Maxim, Sheffield, England, and gantry cranes at the Lackawanna Steel Company and the Fore River Ship & Engline Company. Numerous other illustrations show details in the construction of the various types of cranes.

Recording Gauges.—Crosby Steam Gage & Valve Company, 16 Dey street, New York. Circular. Describes briefly the Crosby pressure recorder, for recording the pressure of any fluid during a certain period of time; the Crosby pressure recorder and gauge, which has in addition an index hand like an ordinary steam gauge, and the Crosby gas, mine and draft recorder, which makes a continuous record of the pressure, either above or below the atmosphere, as ordinarily measured in inches of water.

Railway and Electric Apparatus.—General Electric Company, Schenectady, N. Y. Various publications. No. 1049 is an 8 x 10½ inch book of 84 pages, devoted to railway line material and rail bonds, which lists a very complete line of such devices in their recently improved forms. No. 3341 is a reprint of a paper read before the National Electric Light Association by P. D. Wagoner on Mercury Arc Rectifiers. No. 3367 is a circular briefly describing a luminous electric radiator. Flyer 2166 pertains to a porcelain receptacle for molding wiring. Supply catalogue 7591 lists the parts of edgewise, parallel-rod, 110-volt, direct-current, multiple, inclosed arc lamp, forms 14 and 12. An unnumbered publication contains the report of a test made by Frederick Sargent and L. A. Ferguson on a 2000-kw. Curtis steam turbine.

Mining Machinery.—Jeffrey Mfg. Company, Columbus, Ohio. Bulletin 10. Size, 8 x 10 inches; pages, 68. This catalogue has four subdivisions—electric mine locomotives, electric gathering locomotives, rack rail locomotives and storage battery locomotives. The illustrations show a wide variety of sizes and forms and details of many of the parts concerning which the intending purchaser would be likely to desire information, such as frames, trucks, motor parts, controllers, trolleys, &c. Several of the illustrations show the locomotives in use and are interesting in indicating the diversity of applications possible. Tables of dimensions of the several types are appended, with pages of data required in specifications accompanying orders.

Electric Motors.—Emerson Electric Mfg. Company, St. Louis, Mo. Bulletin 3106, replacing 3062, concerns single phase induction motors, class 32 DA, 1-10 to 1-6 horse-power, condensed type, light load automatic start. Bulletin 3701, replacing 3053, deals with laboratory lathes for alternating current.

Automobiles.—Adams Company, Dubuque, Iowa. Bulletin 5, entitled "A Boost for the Adams-Farwell Motor Car." Contains a collection of extracts from automobile and daily newspapers on the Chicago-St. Paul automobile trip in which the Adams-Farwell car was one of 30 that started and the fifth out of seven that finished. Photographs show the car before and after the trip. The text is limited almost entirely to the movement of the car *en route* and its condition on arriving at St. Paul.

Metal Tiles.—Berger Mfg. Company, Canton, Ohio. Catalogue No. 2. Size, 9 x 12 inches; pages, 24. Gives several illustrations of metal tile roofing made of copper, zinc, galvanized steel and terne tin plates in Spanish, African Horn, Pan-American and Twentieth Century styles.

Rotary Converters.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa Publication 7038. Size, 6 x 9 inches; pages, 38. This is an extensive treatise of Westinghouse rotary converters, their characteristics and construction, with instructions for their erection, operation and care. As its size and the subject of its contents indicate, it contains much useful information for the engineer, operator and student of electrical engineering. Many half-tone engravings and line diagrams are used to illustrate the construction, operation and methods of connecting. Common troubles and how to avoid them are fully explained.

Water Seal Motor.—Warren, Webster & Co., Camden, N. J. Bulletin known as part V, appendix IV, of the company's general catalogue. Illustrates and describes a water seal motor for use in connection with the Webster system of steam circulation, its function being to automatically control the discharge of air and water from radiators, coils and other heating surfaces without loss of steam. Its advantages and principle of operation are fully explained.

Boring Mill.—Gisholt Machine Company, Madison, Wis. Loose leaf for catalogue. Bears an engraving of a 52-inch vertical boring mill, which is referred to by letters in the attending description.

Wonham & Magor, 29 Broadway, New York, have issued a booklet referring to the various lines for which they are New York and export representatives. Among these lines are Primero tool steel for drills and mining work, light locomotives manufactured by the H. K. Porter Company, foundry supplies and equipment by the Whiting Foundry Equipment Company, contractors' supplies by the Continental Car & Equipment Company, industrial and mining cars and auxiliaries by the Wonham-Magor Engineering Works, track and contractors' tools by the Verona Tool Works, and engines, boilers, &c., by the Phœnix Iron Works Company. The publication contains a number of the standard steel lists and tables of weights.

W. P. Snyder Purchases Some Oliver Interests.—W. P. Snyder, Pittsburgh, president of the Shenango Furnace Company, has taken over this week the interests of the Henry W. Oliver estate, the James B. Oliver estate and the Oliver Iron & Steel Company in the four Shenango blast furnaces at Sharpsville, Pa.; also in 1200 acres of coal lands in the Connellsville region, and in all the iron ore properties in which W. P. Snyder and the Oliver interests were formerly joint owners. The negotiations just closed give Mr. Snyder complete control of the Shenango furnaces and coal lands noted above, 40,000,000 tons of iron ore in the Mesaba region, 14,000,000 tons of iron ore in the Marquette region and a large body of iron ore in the Cuyana region. Mr. Snyder also secures control of the Oliver interests in the Shenango Steamship Company, organized recently and now building a large lake ore boat, together with the ownership of large limestone and other valuable mining properties.

A bomb, which it is supposed was thrown from the street through a window, in the early evening of December 19, exploded in a room in the open shop agency established at 7 East Fourteenth street, New York, by the Allied Iron Trades. The room was wrecked and several men in an adjoining room were stunned. The room was recruiting headquarters for men to take the places of strikers on the Post & McCord buildings.

HARDWARE

THE letter of our Washington correspondent in this issue will command wide and careful reading from the interest of the matter contained in it. While apparently little is being said or done under the public eye in regard to a merchandise post there is a great deal doing quietly and unobtrusively of a kind of work which will probably have not a little influence on the course of things. Reference is made in our Washington letter to the reports and recommendations of the postal authorities, which are of peculiar interest as showing with unusual fullness and frankness the way in which the whole subject is regarded in official quarters. The considerations thus adduced and the arguments marshaled will undoubtedly have weight with legislators and have much influence in framing the policy approved by Congress. Concurrently with these official utterances there are, as is well known by those who are in close touch with what is going on at the Capital, other potent influences at work furthering the projects for utilizing the mails for the carriage of merchandise in one or another form of the parcels post movement.

The manner in which this whole subject is presented in the reports of the post office officials, while not perhaps in all cases commanding acquiescence in the conclusions reached, will be generally commended as indicating a broad and reasonable view of the important questions involved and taking into consideration some of the principles of public policy which are often overlooked by the advocates of a parcels post. Among the points forcibly made is the fact that the carrying of merchandise by mail on the scale and terms which have been proposed would involve enormous expense, while the extent of the country would make it impracticable to have one rate of postage applying to distances long or short, in accordance with the established usage in postal matters. It is pointed out that with any low rate for merchandise by mail the express companies would get the business for short distances, on which there would be a profit, while the Government would be called upon to carry goods long distances at a serious loss.

The suggestion that rural routes be permitted to carry merchandise mailed at the office from which they emanate has apparently much in its favor, although as our Washington correspondent points out it would also facilitate the economical distribution of the catalogues of the mail order houses. It would certainly appear to give the local merchants opportunity to serve the people in their vicinity to better advantage than at present and to do something of a local mail order business, which would be profitable to both the Government and the merchants and the cultivation of which would count against the encroachments of the great mail order houses at a distance. The principal objection to be urged against this project is that it would be a parcels post on a small scale and might be extended gradually, perhaps by way of experiment, and thus operate as the entering wedge for a parcels post at large, with all its disturbing influences on trade.

Condition of Trade.

While there is a little relaxing in the purchasing of goods on a large scale there is no letting up in the pressure of business and in every department of the trade, whether in the manufacture or distribution of goods, the year closes with a full measure of activity. Many of the manufacturers are obliged to run their plants to their largest capacity and not a few are unable to supply goods as rapidly as their customers desire. Some, however, are able to accumulate more or less stock and are gratified to be able thus to make provision for what in their judgment will be a prosperous season. Retail merchants are fully occupied taking care of their holiday and winter trade and the reports which come from them indicate that business in these lines will this year be unusually large and profitable. The tone of the market is decidedly strong. It is a matter for congratulation that it has been feasible to keep prices of the raw material down to a reasonable level, but many lines of goods feel the influence of the upward tendency in Iron and advances are frequent and in some cases substantial. The advance in Copper is a marked feature of the market and has necessitated the announcement of higher prices for Brass and Copper goods generally, while at the same time it has had direct influence on the prices of many articles into which Copper enters as one of the materials. Export business continues to increase in volume, but under the pressure of domestic orders manufacturers are tempted to repeat the old mistake of neglecting far-off trade for the sake of that which is near-by. That many of them are too foresighted to pursue this unwise policy is a hopeful feature of the trade at this time. Manufacturers and merchants thus enter upon the holiday season under peculiarly auspicious business conditions, permitted to look back upon a successful year and with hopefulness to anticipate the activities of 1906. Trusting that our readers have enjoyed a good measure of prosperity during the year which is ending and are looking forward cheerfully and with eagerness to 1906, we extend kindly greetings for the Christmas season and the best wishes for the year to come.

Chicago.

The holiday trade throughout the West and Northwest has been exceptionally heavy and the large number of filling in orders received by jobbers during the week has pretty well cleaned up surplus stocks of holiday goods. In some lines in which sales are limited almost entirely to the holiday season jobbers' stocks have been entirely depleted and the second orders of many dealers could not be shipped. Staple lines continue to move fairly well considering the season, but as dealers are devoting their entire attention to the holiday trade jobbers do not expect much in this line until after the first of the year. The upward movement of raw material values remains unchecked and manufacturers of finished products are compelled to move up prices from time to time to conform with the higher values they are compelled to pay for their material. Prices on Iron and Steel products notwithstanding the heavy orders on the books of the mills are stationary for the present at least, but metal prices continue to advance from day to day and further advances on metal goods are anticipated. The Western Association of Stove Manufacturers last week put into effect an advance of 5 per cent. on all kinds of Stoves and Ranges and similar action is expected to be taken by the Central and Eastern associations. This advance has not generally been followed by outside manufacturers, who consider the advance inadvisable at this time, notwithstanding the sharp advances made on all

materials entering into Stove construction. Weather conditions continue very favorable for the heavy consumption of all classes of Wire products and manufacturers continue in receipt of heavy orders. The tonnage placed with the mills thus far this month exceeds that of any similar period in the history of the trade and the speculative buying is at a minimum, although higher prices are looked for with the advent of the new year. Manufacturers of Eaves Trough and Conductor Pipe are already receiving orders from the jobbing trade for deliveries during the spring months. Another advance has been made by manufacturers of Cotton Sash Cord, due to the higher prices prevailing for cotton and the heavy orders booked during the past few months, notwithstanding the high prices prevailing, indicate that the building trade next year will be unusually heavy. Prices of Builders' Hardware continue to be well maintained and an advance on solid bronze goods would not be at all surprising in view of the high prices prevailing on copper. Financial conditions throughout this territory are very satisfactory and collections are easily made, despite the stringency of the Eastern money market.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—There is so much holiday in the air that it is difficult to confine one's attention to the more humdrum details of trade statistics. The weather thus far has been mild and open, allowing all sorts of outdoor work to continue and giving opportunity in the cities and larger towns for extensive Christmas shopping. Indications are not lacking that retail merchants everywhere are doing a rushing Christmas business, as it is hard to recall a time when mail and wire orders were greater in volume and variety.

Some months ago there were not lacking those who felt that we were at the top of the wave of prosperity and predicted a more or less gradual decline in prices and a very much decreased volume of business. Some of us could not see these indications and as the months have passed the outlook for 1906 has continued to brighten. Surely this country, with record crops at almost top prices, with an iron production before unequaled and yet too small to meet the demand, so much so that every steel rail that can be made in 1906 has been contracted for; with the balance of trade growing in our favor every month and with an ever widening export outlet, cannot be in serious danger of a sudden financial or business setback.

None the less gratifying has been the advancement in our internal political conditions, and while statistics are harder to compile in this field, improvement can be noted in every section of our broad country. A spirit is abroad among good Americans everywhere that uses for its slogan the words of our President, "A square deal for every man," to be obtained in the spirit of the sentiment of one of his martyred predecessors, who said: "With malice toward none, with charity for all."

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—This will be our last report in the year 1905. It has been an unusual year in many respects—in a business way and in national and world-wide affairs. Important events have followed upon each other's footsteps so quickly that the student of contemporaneous history was often bewildered in his efforts to keep up with the news of the day. Of all countries in the world ours seems to have enjoyed the greatest measure of prosperity.

Let us close the old year with thankfulness for our material benefits. We extend to all members of the Hardware trade—manufacturers, jobbers, retailers, trade papers and catalogue houses—our best wishes for a Merry Christmas. Let us temporarily bury our hatchets, smoke the pipe of peace and enjoy Christmas with good will toward all men.

Cleveland.

THE W. BINGHAM COMPANY.—Trade and traffic in the Hardware, mining, milling and manufacturing lines have been very satisfactory all the season and the demand still continues. Large orders are being placed for goods for shipment in the forepart of next year and customers would do well to place their orders at once at the prices they are able to obtain on the different commodities that will be shipped to them in the spring, for certainly the demand will be such that only those who cover their wants promptly will have the goods on hand in time to serve their customers.

Prosperous times seem to be the rule in all our borders and we are approaching the Christmastide with a feeling that we have all had a liberal portion of this world's goods, and certainly every one should be in a happy frame of mind and therefore have a very Merry Christmas. We extend to our friends this greeting.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The market shows no signs except those of decided strength and appreciation of values. There is a free buying movement on and fortunately this has not been interfered with by any extraordinary advances. The policy of the leading interests seems to be that of selling freely as the values force themselves up a little at a time—$1 a ton here, $2 there, possibly—but were it not for this restraining influence we believe there would have been very marked advances and later we should have had to pay for them in the good old-fashioned way, with our heads under the pump in the morning. It is a great lesson in political economy, this steadying of prices by means of large control, and is in pleasing contrast with the wastefulness exhibited in other departments of high finance where large amounts of money are involved and where the temptation to make a pile quickly seems to have been almost irresistible.

The country is getting a great many sermons now based on the retribution which comes with the unscrupulous handling of funds, particularly when they are contributed by a large number of confiding people. That the outcome of it will be helpful and healthy no one doubts, and it should be some time before we again see the officers of our large moneyed institutions endeavoring to mark their financial abilities by means of social functions in the great ballrooms of the country. A question might be raised between the host on an occasion of this kind and a disgruntled Boston speculator as to who set the ball rolling, but rolling it certainly is, high, low or between decks, as the case may be. The investigations in New York of methods in life insurance service are being read with the closest interest all over the country where the great body of policy holders live.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—There is little or no change to report regarding trade conditions in the Pacific Northwest. We have now arrived at the season when most houses are busy with their annual inventory, so that a seasonable dullness is noticeable but to be expected. Trade in November and so far in December has been as good as the season of the year justifies.

We notice with interest that Wall street feels the effect of the widespread business activity in real estate and building operations that every financial center of the United States is now enjoying, in the fact that capital is more fully and satisfactorily employed at home than loaning at 2 per cent. in New York; consequently they have to pay as high as 28 per cent. for their money. It is possible this condition, coupled with the fact that less insurance money is going to New York both on old and new business, may be a serious menace to that center.

January 1 a life insurance company is to begin business in Portland with a larger paid up capital and more business assured than one or more of the three big companies in New York had when they started, with strong men back of it, tending still further to keep Oregon money at home. Undoubtedly other State financial centers will pursue the same course, to the ultimate good of all parties except New York.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—December thus far has been a month of fine weather; indeed, we do not recollect ever having seen a more favorable December

and at this writing we have the promise of more of it. Outdoor work has gone along steadily, there having been but one interruption during November and December—a snowstorm of considerable force about December 1. In fact the weather conditions throughout the year have been unusually favorable.

This has enabled our farmers generally to raise and harvest good crops. Threshing has been done and also most fall plowing. The heavy crops of grain have been pushed forward to market as fast as the congested condition of the railroads would permit. Farmers are able to make necessary repairs, so that they go into winter quarters in good shape. The mild weather also reduces considerably the important item of fuel expense. The railroad congestion has also been reduced by the favorable weather conditions, which have already been changed from "serious" to "severe" and will doubtless be modified still more in the near future.

Business has been quite active, probably as much so as in any December within the recollection of any of our merchants. New buildings have been pushed ahead and so have repairs in general. All this creates demand for Hardware. Seasonable goods have also been in active demand and thus our houses have been kept busy, the order floors presenting much the same appearance as in the usually more active months. This will now soon change. Already the salesmen are closing their trips and by the end of this week they will all be in and the house forces will be at work on inventories and in getting ready for the New Year.

The year 1905 closes satisfactorily and most houses would doubtless be pleased if they could know that for the next 10 years they could count on as favorable results. Good crops and good prices for them, together with steady and in many cases advancing markets on Hardware, make a combination that must produce favorable results. These conditions will make active trade for months ahead and until the new crop becomes a prominent factor. For the present and so far as we can see ahead the conditions are good and the year closes well.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—Business for December has been remarkably good, sales showing quite an increase over the same month of last year. The movement of Guns, Cutlery, Silver Ware, Toy Wagons and other holiday goods has been enormous, and the stocks of jobbers in these lines are about exhausted. Business just now is dropping off a little on account of Christmas being so near and things will be rather quiet until after the first of January. Quite a number of salesmen are in the house or at home spending their holiday vacation.

A number of spring orders have already been taken and the salesmen who are on the road are sending in quite a number of spring bills, particularly in the Saddlery and Harness line. We look for the regular spring trade to open early in the South this year, and believe that it will be one of the largest and most satisfactory years that the Hardware jobbers in the South have ever had.

The year now drawing to a close has been rather an unusual year for the merchants of the South, and considering the number of calamities that have occurred we think the trade has fared unusually well. To review the past year a little we will say that a little more than 12 months ago the big slump in cotton came, curtailing business a great deal all over the South and from which the merchants did not recover for several months. Then in February the terrible weather set in, which lasted for nearly four weeks, and simply paralyzed business throughout the country. In the early summer, when things were beginning to pick up and the people had recovered from their other troubles, the yellow fever broke out, and from that time until fall business was hampered and interfered with by yellow fever and quarantine laws. All of these things are now behind us and future sailing looks bright and we do not see anything to prevent us from enjoying a good business the coming year as conditions in the South were never better. We wish *The Iron Age* and its many readers a Merry Christmas and a Prosperous and Happy New Year.

NOTES ON PRICES.

Wire Nails.—Jobbers' stocks have been considerably depleted by the continuous demand upon them owing to the unusual consumption during the past weeks. Orders placed during the last month and a half are in excess of mill shipments, causing delays in deliveries. Mills are rigidly adhering to the rule of not accepting orders for shipment later than 60 days after the date of ordering. Specifications are coming in freely and new business is being booked in anticipation of an advance near the first of the year. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.80
Carload lots to retail merchants	1.85

New York.—Thus far this month the distribution of small lots of Nails from store has been in excess of the same period during November. The continued open weather has permitted the continuance of building operations to a remarkable degree for the season. The market is generally well maintained at regular prices. Quotations for small lots from store are on the basis of $2.05.

Chicago.—Jobbers are placing heavy contracts with the mills for 60-day requirements, the impending advance no doubt having considerable effect on the size of the individual orders. Not that there is any speculation, but the jobbers are unusually anxious to be well covered in the event of an advance. The tonnage placed with the mills this month promises to break all records for the closing month of the year and the present prices, which are extremely low considering the general range of Iron and Steel values, has influenced buying to almost as great an extent as the heavy demand, which continues on account of the open weather. Jobbers' and dealers' stocks are, however, generally low and replenishment orders are numerous. Quotations are unchanged, as follows: $1.95 in car lots to jobbers and $2 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—We note a continued heavy demand for Wire Nails, new orders being received by the mills very freely, while specifications on contracts are also coming in at a rapid rate. The feeling prevails that prices of Wire Nails may soon be advanced, possibly about the holidays, and the trade is placing liberal orders in view of this expected advance. It is quite likely that a meeting of the Wire Nail interests will be held in the latter part of this month and an advance of about 10 cents a keg will probably be made. There is still some shortage in steel among the mills and the supply of cars is only fair. Prices are firm and we are advised that all the leading mills are adhering closely to official figures. We quote Wire Nails at $1.80 in carloads to the largest jobbing trade and $1.85 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days.

Cut Nails.—A fairly active demand exists and mills are endeavoring to restrict production to conform with actual demand as far as possible. Quotations are as follows: $1.70, base, for carload lots, f.o.b. Pittsburgh; $1.75 for less than carloads, f.o.b. Pittsburgh; $1.85 for carload lots, on dock, New York; $1.90 for less than carloads, on dock, New York. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

New York.—Demand is about in the usual proportion to that of Wire Nails and is fair in volume. Small lots are generally quoted from store at $1.95 base, the exception being a few cheaper Nails, of which there are broken stocks.

Chicago.—Local jobbers report steady demand for Nails, and stocks are very low and mill shipments unsatisfactory. Prices are firmly maintained and another advance would not be surprising in view of the high prices prevailing for raw material. We quote Steel Cut Nails at $1.90 to $1.95 in car lots and Iron Cut Nails $2 to $2.05.

Pittsburgh. Some of the mills making Cut Nails are

having difficulty in getting raw material, which is delaying shipments to some extent. We note a moderate demand and the tone of the market is very firm. Some of the mills that are pretty well sold up are asking a premium of about 5 cents a keg for prompt shipment. Quotations are as follows: $1.70, base, for carload lots, f.o.b. Pittsburgh; $1.75 for less that carloads, f.o.b. Pittsburgh; $1.85 for carload lots, on dock, New York; $1.90 for less than carloads, on dock, New York. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—Most of the business engaging the attention of the mills is filling specifications on contract orders. It is anticipated that after the first of the year orders will be received in large volume. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.95	$2.25
Retailers, carload lots	2.00	2.30
Retailers, less than carload lots	2.10	2.40

Chicago.—Demand is limited almost entirely to small lots for shipment to the South and Southwest. Jobbers throughout the West and Northwest are not expected to place contracts for their requirements until after the first of the year. Quotations remain unchanged: To jobbers, Chicago, car lots, Painted, $2.10; Galvanized, $2.40; to retailers, car lots, $2.15; Galvanized, $2.45; retailers, less than car lots, Painted, $2.25; Galvanized, $2.55; Staples, Bright, in car lots to jobbers, $2.05; Galvanized, $2.35; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Current tonnage is light but specifications on contracts continue to come in very freely. It is expected that the large jobbing trade will place orders for spring business shortly after the first of the year. It is said that stocks of Barb Wire in the hands of jobbers are much lighter than usual at this season. Some in the trade look for an advance in prices of Wire in the latter part of this month. We quote Painted Barb Wire at $1.95 and Galvanized at $2.25 in carload lots to the large jobbing trade, with the usual advance of $1 a ton to retailers in carload lots, f.o.b Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—The mills are engaged in shipping specifications received on contract orders, which are coming in freely. The tone of the market is firm at the following quotations, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.65
Retailers, carloads	1.70

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&	12½	13	14	15	16
Annealed	Base	$0.05	.10	.15	.25	.35	.45	.55	
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—Specifications on contracts placed some time ago continue very heavy and in many cases are in excess of mill shipments. Little new business is being placed, however. Quotations are unchanged as follows: $1.80, f.o.b. Chicago, in car lots, and car lots to retailers, $1.85.

Pittsburgh.—New business being placed is small but buyers are specifying very freely on contracts and shipments from the mills continue heavy. There is still some trouble in getting prompt deliveries of steel and this is likely to continue for some time. Prices are firm and there is a general expectation of an advance before January 1. Quotations are as follows, f.o.b Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.65
Retailers, carloads	1.70

The above prices are for base numbers, 6 to 9.

Hatchets.—There has been a good deal of opposition on the part of the jobbing trade to the rule under which the associated manufacturers of Hatchets have been working, that the rebates paid to their customers should be conditional on loyalty—that is, on their customers purchasing exclusively association goods. In view of this opposition and the decided feeling of the trade that they should be free to buy wherever they please we are advised that the association has agreed to withdraw the objectionable restriction.

Copper Products.—There have been some further advances in Copper products, as intimated, since last week. Copper wire, bare and insulated, has moved up ½ cent per pound, to 20¼ cents, Brass Sheets to 12½ per cent., Brass Wire to 12½ and 15 per cent. discounts respectively, according to sizes, Brass Rods to 15 and 5 per cent. and Brazed Tubes to 25 per cent. discount, for both Brass and Copper. There appears to be a fairly good business at the enhanced prices, although naturally the bulk of the trade is being executed at lower rates under contracts made at the various levels of the advancing market.

Stoves.—At the annual meeting of the Western Association of Stove Manufacturers, which was held December 12 at St. Louis, it was made evident that a very firm tone characterizes the market for Cast Iron Stoves and Ranges. The general prosperity of the country and the high prices prevailing for raw materials contribute directly to the strength of the market, Pig Iron prices having advanced from 30 to 35 per cent. since the last prices were established. In view of this condition of things a number of the manufacturers announce an advance of 5 per cent., but it would appear that some manufacturers, especially those not affiliated with the association, are holding to former quotations. Others have withdrawn quotations and are declining to accept business beyond 90-day delivery on Ranges. The demand for Heaters, Cook Stoves and Ranges during the year has been exceptionally heavy, breaking apparently all records in the history of the trade.

Window Glass.—Shipments from factories have shown some improvement during the week owing to an increase in demand, due probably to the low quotations which have recently been made. Prices at which factories are selling Glass are said to represent a money loss on every box. As a result some of the financially weaker factories have gone out of blast and others are expected to follow. The productive capacity of the country if all the factories were in operation would no doubt exceed requirements. In the local market demand is light and quotations are as follows: First three brackets, single, 90 and 10 to 90 and 20 per cent. discount; all other sizes, 90 and 5 to 90 and 10 per cent. discount. The market is unsettled. Official announcement was made last week by John Pitcairn, chairman of the Board of Directors of the Pittsburgh Plate Glass Company, that a proposition to increase the capital stock of the company $5,000,000 would be placed before the stockholders at the annual meeting to be held in Pittsburgh on February 13. The directors propose to build a new Plate Glass plant at Crystal City, Mo., with a capacity of at least 6,000,000 feet of Glass per year, and the additional $5,000,000 will be used for building these works.

Linseed Oil.—Owing to a report of a shortage in the India Flax Seed crop, which has been followed by quite active buying of seed for export and an advance in domestic Seed, some crushers have advanced prices of Oil. Demand is light and is expected to continue so for some time. Quotations, on the basis of Raw Oil, range from 36 to 38 cents per gallon for prompt delivery.

Spirits Turpentine.—According to Southern reports the different Turpentine interests have formed a combination by which all friction is to be eliminated. A minimum price of Turpentine has been established for a term of five years, it is understood; also production is to be reduced so as to make the supply less than the demand. Local prices have advanced about 3 cents during the week in sympathy with the Southern market. New York quotations are as follows, according to quantity: Oil Barrels, 67½ to 68 cents; Machine Made Barrels, 68 to 68½ cents per gallon.

Rope.—With the advance of the season orders are falling off somewhat in volume, though demand continues fairly active. Under this condition the market may show some weakness, as is not unusual under similar circumstances. The usual revival of business for the

spring months is anticipated by the manufacturers to show itself by the middle of January or the first of February. Quotations are as follows: Pure Manila, 12½ cents; B quality, 11½ cents; Pure Sisal, 9½ cents; No. 2 quality Sisal, 8 cents per pound.

CHARLES WEILAND.

CHARLES WEILAND, 147-149 Chambers street, New York, is a large wholesaler of Hardware and related goods, prominent among which are Mechanics' Tools, Cutlery and House Furnishing Goods. The business was established in 1882 under the most primitive auspices in Grand street, near the East River; was later moved to the Bowery, but for the greater portion of the entire period has been at the above address. As the business grew additional space has been taken until there are now a total of 16 floors, many of which run the entire length of the block to 129-131 Reade street. Considerable space is given to sampling, but aside from the necessary room for offices, receiving, packing and shipping, the various floors are provided with shelves for holding open stock, in addition to other space for original cases. A large part of the business has developed into the handling of only first quality goods, but Mr. Weiland has long made a specialty of buying blocks of Hardware, either first or second quality, and goods which for many reasons are classed as jobs. No stock is too large for absorption if terms can be agreed on, it often happening that a manufacturer finds it expedient for reasons satisfactory to himself to sacrifice a line on which he is overstocked or which is to be discontinued. The goods are marketed both by catalogue and road salesmen, among Hardware merchants and to general stores principally.

THE BRASS MANUFACTURERS' ANNUAL MEETING.

THE Association of Brass Manufacturers of the United States, of which Wm. M. Webster, Chicago, is commissioner, held its annual meeting at the Hollenden Hotel, Cleveland, Ohio, December 11 and 12. It was one of the most successful and well attended meetings in the history of the association. Some very valuable papers were read, among them one on the subject of cost by J. G. Murdock, Jr., of Cincinnati, and a uniform method or system of arriving at costs was adopted.

Owing to the high prices of copper and other raw materials an advance in prices of 10 per cent. was deemed advisable. The following were elected to membership: Hoffman & Billings Mfg. Company, Milwaukee, Wis.; Clum & Atkinson, Rochester, N. Y.; P. Healey, Evansville, Ind.

The following officers were elected for the ensuing year: President, E. C. Regester, Baltimore, Md.; trustees, A. S. Hills, Haydenville, Mass.; F. K. Dibley, Milwaukee, Wis.; W. D. McRea, Detroit, Mich.; Theo. Ahrens, Jr., Louisville, Ky.; W. G. Radcliffe, Cleveland, Ohio; Wm. Ivy, St. Louis, Mo.

The next meeting will be held in Washington, D. C., in February.

The Thorndale Hardware Company, Thorndale, Texas, has been incorporated with a capital stock of $10,000, purchasing the stock of May & Tattsche.

Hiskey & O'Meara have removed their Shelf and Heavy Hardware, Stove, Implement, Paint and Sporting Goods stock from Havensville to Emmett, Kan.

A. E. Kneeland has disposed of his business in Harrington, Kan., to the Harrington Hardware Company, which continues at the old stand.

Nichols & Rankin Company, Burlington, Iowa, have sold their branch store at Raritan, Ill., to Perry Cooper.

A. H. Sheldon & Co., Janesville, Wis., have lately incorporated under the name of Sheldon Hardware Company, with a capital stock of $25,000.

TRADE ITEMS.

AMERICAN SUPPLY COMPANY, Mobile, Ala., has lately opened a new store at 16 South Commerce street, the company's warehouses being located at 15 and 17 South Commerce street and 14 and 16 South Front street. The company is now better equipped than ever before to take care of orders intrusted to them for a large and comprehensive line of Railway and Mill Supplies.

THE L. S. STARRETT COMPANY, Athol, Mass., maker of fine Mechanical Tools, announces that it has purchased the Leveling Instrument and Transit business of the Richardson-Oliver Company, Athol, Mass., formerly C. F. Richardson & Son, who for many years made a line of Leveling Instruments adapted for the use of architects, carpenters, stone masons and others. The Starrett Company will hereafter produce and market these Tools in connection with its present extensive line.

NATIONAL CUTLERY COMPANY, Detroit, Mich., is calling special attention to its line of S. & S. Butcher Knives, which are sold under a guarantee that they are of even temper and free from soft or hard spots and will hold an edge. The Knives are described as forged by skilled workmen from a special formula steel for which strong claims are made.

A MEETING of the Executive Committee of the Kentucky Retail Hardware and Stove Dealers' Association was held in Louisville on the 14th inst. to complete arrangements for the annual convention, which will be held in that city on February 20, 21 and 22. The meeting will be held at the Galt House, where space in rooms will be rented to exhibitors at reasonable rates, particulars in regard to which may be obtained from the hotel management direct. The banquet will also be held at the Galt House.

AUGUSTUS D. LAMB, an old resident of Chicago and pioneer in the Hardware business, died December 17, aged 74. Mr. Lamb was born at Tioga, Pa. He came to Chicago in 1853, entering the employ of the Hardware firm of Eddy & Butler. A few years later he entered the firm of Tuttle, Bartlett & Co., which was afterward reorganized under the name of Hibbard, Spencer, Bartlett & Co., in which firm he was a partner until he left to organize the business of Brintnall, Lamb & Co. He retired from active business ten years ago. Mr. Lamb was married in 1859 to Anna E. Bissell and is survived by an only son, Benjamin B. Lamb.

THE CHATTANOOGA BROKERAGE COMPANY, which recently commenced the manufacturers' agency business in Chattanooga, Tenn., has changed its firm style to J. S. Lupton & Co. It was found that a grain concern was operating under the same name.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate.

FROM R. WOODMAN MFG. & SUPPLY COMPANY, 63 Oliver street, Boston, Mass., whose plant was somewhat damaged by fire and water on the 12th inst. This will entail slight delay in filling orders until insurance is adjusted. The company's collection of catalogues was destroyed.

FROM BALL SUPPLY COMPANY, 370 King street, Charleston, S. C., which is adding a line of Hardware and Agricultural Implements to its former Paint, Oil and Glass business.

The Iuka Hardware Company, Iuka, Miss., has incorporated, with a capital stock of $10,000, to deal in Hardware, Stoves, Farming Implements and kindred lines. The incorporators are W. O. Jackson, W. W. Harvey, W. J. Brinkley and L. D. Alsobrook.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our catalogue department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

WM. SHIMER, SON & CO., Freemansburg, Pa.: Illustrated circular relating to Toy Pistols, Cannon and Bombs.

DILLON-GRISWOLD WIRE COMPANY, Sterling, Ill.: Booklets referring to Griswold and Sterling Diamond Field Fence; also price-list of Griswold patent Steel Wire Bale Ties.

BOWERS RUBBER COMPANY, San Francisco, Cal.: Catalogue of Rubber Hose, Belting and Packing, Mats, Tiling, Hose Carts, Reels and Brass Goods; also circular referring to Dods' Cross Expansion Piston Packing.

WILEY & RUSSELL MFG. COMPANY, Greenfield, Mass.: Catalogue No. 33, referring to patent screw cutting and other labor saving Machinery and Tools.

FOREST CITY BIT & TOOL COMPANY, Rockford, Ill.: Catalogue G, 48 pages, illustrating and describing Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and other Tools.

THE STANDARD SCALE & SUPPLY COMPANY, Pittsburgh, Pa.: Folder illustrating and listing a few selections from the company's extensive line of Standard Scales.

PENNSYLVANIA RUBBER COMPANY, Jeannette, Pa.: Catalogue of Rubber Belting, Hose and Fittings, Packing and Specialties.

THE DUFF MFG. COMPANY, Pittsburgh, Pa.: Special bulletin of Duff Roller Bearing Ratchet Screw Jacks and Improved Roller Bearing Screw Jacks.

JOSEPH STOKES RUBBER COMPANY, Trenton, N. J.: Catalogue of Rubber Belting, Hose, Packing, Blankets, Matting and Specialties.

A. LESCHEN & SONS ROPE COMPANY, 920-922 North First street, St. Louis, Mo.: Catalogue No. 26 of Wire Rope, Manila and Sisal Rope and Cordage, Tackle Blocks, &c.

VOORHEES RUBBER MFG. COMPANY, Jersey City, N. J.: Catalogue of Rubber Hose and Belting, Mats and Matting, Brass Fittings, &c.

J. E. RHOADS & SONS, Philadelphia, Pa.: Illustrated catalogue price-list devoted to Belting and Rubber Goods.

SUPERIOR SPRING HINGE COMPANY, 15 South Canal street, Chicago, Ill.: Illustrated circular and price-list relating to Superior Ball Bearing, Adjustable Tension Floor Spring Hinges and Superior Door Holders.

NEW JERSEY CAR SPRING & RUBBER COMPANY, Jersey City, N. J.: Catalogue of Rubber Belting, Hose, Packing, Mats, Matting and Specialties.

DUNHAM, CARRIGAN & HAYDEN COMPANY, San Francisco, Cal., and 127 Duane street, New York: Attractive hanger sign in the interest of Clean Cut Tools and Cutlery.

CALENDARS, &c.

IVER JOHNSTON'S ARMS & CYCLE WORKS, Fitchburg, Mass.: Large hanger calendar, with monthly sheets.

SUPERIOR SPRING HINGE COMPANY, Chicago, Ill.: Desk calendar, with monthly sheets.

JOHNSTON HARVESTER COMPANY, Batavia, N. Y.: Attractive colored hanger, calling attention to the company's products.

HOPKINS & ALLEN ARMS COMPANY, Norwich, Conn.: Large hanger calendar, with monthly sheets.

SHIRLEY RADIATOR & FOUNDRY COMPANY, Indianapolis, Ind.: Hanger calendar, with sheets for each week.

PHILADELPHIA LAWN MOWER COMPANY, Philadelphia, Pa.: Monthly calendar for desk use.

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Recommendations of the Post Office Department.

FROM OUR REGULAR CORRESPONDENT.

WASHINGTON, D. C., December 19, 1905.

THE forthcoming annual reports of the Second, Third and Fourth Assistant Postmasters-General will furnish some highly interesting details, showing not only the bases for the recommendations of Postmaster-General Cortelyou, published in *The Iron Age* last week, but also the particular line of reasoning adopted by his aides in making their suggestions with respect to the domestic parcels post, the reduction of postage on merchandise, the extension of the rural free delivery service, &c. The extracts from these reports presented below will no doubt be read with much interest by Hardware merchants, and it is an encouraging fact that, while certain of the recommendations are distinctly adverse to the welfare of the retail trade, in other respects the reports disclose an attitude on the part of the Postmaster-General's assistants that will be most helpful to the retailers in their contest with the giant catalogue concerns. Perhaps

The Most Significant Feature

of the three reports is the short chapter devoted by Second Assistant Postmaster-General Shallenberger to a discussion of the proposition to establish a domestic parcels post. It appears from General Shallenberger's remarks that his recommendations form the basis of the Postmaster-General's statement, published in this correspondence last week, outlining the objections to the establishment of a parcels post. It will be remembered, however, that General Shallenberger makes no reference to the advisability of installing an experimental parcels post, but on the contrary emphasizes the enormous cost that would have to be met should the United States attempt to follow the example of the comparatively small European countries where merchandise in large quantities is conveyed by the postal service. General Shallenberger says:

> There has been a good deal of discussion in the public press during the past year for and against the establishment of a domestic parcels post in the United States. In this country a uniform rate of postage, regardless of the distances over which the mails must be transported, has been firmly established as a sound principle of postal administration. If a domestic parcels post were established under such conditions there would be involved either a high rate of postage or a large deficit in the attempt to compete with the express companies, thoroughly organized for handling parcels under the zone system, charging in proportion to distance carried. The parcels post would naturally
>
> GET ALL THE LONG DISTANCE PARCELS,
>
> which would be carried at a loss, and the express companies all the short distance parcels, because zone rates would be less than postage rates. To be effective a domestic parcels post would have to be organized on practically the same lines as the express companies conduct their business in this country and as parcels post service is conducted in other countries. The rates of postage would have to be reduced below the rate charged by the express companies, and a large deficit would inevitably be incurred. The present facilities of the postal service, organized primarily for the transportation of letters, news and small packages, would have to be enormously increased if it were determined to adopt such a parcels post system as has been urged by some of our people.
>
> UNWISE.
>
> This office is of the opinion that it would be unwise to ask authority of Congress for the establishment of a separate parcels post in the domestic service at this time, but it is earnestly recommended that third and fourth class mail matter be merged at the rate of 1 cent for each 2 ounces. This could be done without the necessity of rearranging the service. All merchandise parcels not exceeding 4 pounds in weight would continue to be carried in ordinary pouches and sacks at one-half the rate now charged and afford opportunity for distributing light packages to a multitude of places not reached by the express companies, and at a cost sufficient to reimburse the Government for actual cost of carriage.

It is greatly to be regretted that General Shallenberger did not content himself with the very businesslike argdments presented against the establishment of a domestic parcels post. His plea for a reduction in the merchandise rate from 16 to 8 cents per pound will serve to encourage the catalogue houses in their effort to secure this most valuable concession, which would mean the saving of hundreds of thousands of dollars of postage annually. This project was originally brought forward by Third Assistant Postmaster-General Madden, and its advocacy by General Shallenberger will surprise those who have followed with satisfaction the Second Assistant's rational and conservative course.

Consolidation of Third and Fourth Class Matter.

The proposition to consolidate third and fourth class mail matter, thereby providing merchandise with a postage rate of 8 cents per pound, recommended by General Shallenberger, is somewhat amplified by Third Assistant Postmaster-General Madden in his report, and it is evident that the Department is preparing to bring all possible influence to bear to secure the enactment of the necessary legislation to reduce the merchandise rate. Retailers in all lines should take warning and lose no time in presenting their views to their respective Senators and Representatives, and especially to Hon. Jesse Overstreet of Indiana, chairman of the House Committee on Post Offices and Post Roads. General Madden says:

> In the interest of better postal administration and more efficient postal service for the public, I beg to present for your most serious consideration, and possibly for submission to Congress, the question of a thorough revision of all the laws in relation to the classification of mail matter except that of the first class, which is composed of letters, United States postal cards and private post cards.
>
> The matter of classifying the mails should be so simple that any postmaster, or any other person, ought to be able to determine the rate accurately and beyond doubt. There should be no necessity for a postmaster, when matter is presented for mailing, to submit the question to the Department for the consideration of experts in order to determine what rate should be charged, as is now so often necessary under our complicated classification system.
>
> As between matter of the third and fourth classes there is much difficulty of correct and satisfactory administration. It often happens that similar matter mailed at one post office at the third-class rate is at another post office, due to the different interpretation of the postmaster there, required to be prepaid at the fourth-class rate. This is a great annoyance to the public, and it is unjust and a great hardship to patrons of the service. It can be corrected only by a ruling of the Department. One of the postmasters is, of course, wrong in his interpretation. This is expensive to the person who is required to pay the higher rate, if it be improper, and that sort of thing brings reproach upon the service. The consolidation of the third and fourth classes, which I recommend, will correct this. Simplification is what is needed, and needed badly, and it should be carried to the utmost. The interests of the Government and of the public require an entirely new classification law as to matter now falling within the second, third and fourth classes in order to establish the mail service on up to date conditions. There has been a complete revolution in the commercial world since the passage in 1879 of the present classification act. It does not meet modern needs. The classification laws should be modernized.

Three Classes.

In summarizing his recommendations General Madden says:

> That Congress be asked to enact simpler provisions for the classification of all mail matter and to subdivide all mail matter into three classes, the first class to consist of letters, postal cards and post cards and all matter sealed against inspection; the second class to consist of all printed matter, with special provision for the treatment of and a special rate for newspapers and periodicals; the third class to consist of all matter not included in the first two; the rate of postage for each class and the subdivisions of the second class to be determined after a consideration of the cost of the service rendered and the necessities for revenue.
>
> That Congress be asked to enact, in the event of the failure of the next preceding recommendation, that the third and fourth classes of mail matter be consolidated.

Parcels Post on Rural Routes.

Hardly less interesting than the recommendations of his colleagues are those brought forward by Fourth Assistant Postmaster-General DeGraw. Ignoring entirely the subject of the delivery of mail on rural routes by box number only, Mr. DeGraw renews the recommendation of former Fourth Assistant Postmaster-General Bristow for the establishment of a sort of parcels post on rural routes and limited to mail matter eminating from the distributing office. Mr. DeGraw says:

> It is believed that a special rate of postage on books and merchandise carried on rural routes, to be transported only to and from the distributing office, with a low limitation on the weight per package, if established with proper safeguards, would enhance the postal revenues or at least turn to the Department the revenue on the express package business carried on by the carriers on request of patrons.
>
> With the establishment of rural mail delivery and the in-

creasing extension of rural telephone service by private interests there has grown up a demand by the patrons of the rural service for the delivery of small packages of merchandise, such as food stuffs, tobacco, dry goods, drugs, &c., on an order to the local merchant by telephone or otherwise. The value of these packages of merchandise is usually small, and the present rate of postage of 1 cent per ounce is practically prohibitive. The patron or merchant cannot afford to pay 16 cents for the delivery of a pound of coffee or tobacco or similar article, but if a special rate were established on such matter from the distributing office for delivery to any patron on the rural routes from that office it would be a great convenience to the patrons and become a source of revenue to the Department.

It is therefore recommended that the Congress fix a rate of 3 cents per pound or any fractional part thereof on packages of books or merchandise not exceeding 5 pounds mailed at the distributing post office of any rural free delivery route for delivery to a patron of said route. This rate should apply only to packages deposited at the local post office for delivery to boxes of patrons on routes emanating from that office, and not to mail transmitted from one office to another. The rate of 3 cents per pound would be ample remuneration for the Department, because there is no expense for railway transportation, and the system by which these packages are to be delivered is already established, and such delivery would entail no additional expense upon the Department. A special stamp could be provided for this class of mail matter.

Mail Order Houses Chief Beneficiaries.

When this suggestion was made a year ago it was favored in some sections as likely to be of advantage to the local retailer in the delivery of small purchases to his customers on rural routes. It has since been very carefully analyzed, however, and it is now believed that such a service would be of chief advantage to the mail order houses in furnishing them with a very cheap method of distributing their catalogues. At present these catalogues are circulated at a cost of about 32 cents each. If shipped by freight to a single individual residing in a town from which rural routes radiate they could be there mailed and distributed by rural carriers at 12 cents each, thus effecting a saving of 20 cents each, or an economy of $20 on a sufficient number of catalogues to cover a single route. An average of five routes usually radiate from a single office, so that the saving in postage would thus amount to about $100 for each distributing office, a profit from which need be subtracted only a very small sum to cover the freight charge on the bulk package and a small commission to the party receiving and mailing the catalogues.

Growth of the Rural Service.

Mr. DeGraw furnishes some very interesting statistics showing the progressive growth of the rural service and the conditions which are to be imposed for the regulation of its extension in the future. The growth of the service since its inauguration in 1897 is shown in the following table:

Fiscal year.	Appropriation.	Routes in operation.
1897	$40,000	83
1898	50,000	148
1899	150,000	391
1900	450,000	1,276
1901	1,750,000	4,301
1902	3,993,740	8,466
1903	8,054,400	15,119
1904	12,921,700	24,566
1905	21,116,600	32,055

The Estimates for the Coming Year

are presented as follows:

There were in service on June 30, 1905, 32,055 carriers, and it is estimated that service will be installed during the current fiscal year on 6119 routes, making a total of 38,174 routes in operation June 30, 1906. To maintain the service of these carriers for the ensuing fiscal year will require $26,989,628.

For the two years previous to the current calendar year the average number of routes recommended for establishment was approximately 600 per month. For the current calendar year it is estimated that this average will be about 550 per month, and believing that there will be a decline in the number of petitions filed and cases favorably reported, the number of routes recommended for establishment during the ensuing fiscal year, at a conservative estimate, will not exceed 5040; and estimating the average salary of the carriers on the proposed routes at $696 per annum, there will be required to install this service, apportioning it by months throughout the fiscal year, $1,834,900. This makes a grand total for the pay of rural letter carriers of $28,824,528, which is incorporated in the estimate in round numbers—namely, $28,825,000.

County Service.

Regarding the development of the service, and especially the installation of what is known as complete county service—a matter of much moment to retail merchants in those sections where such complete service is established—Mr. DeGraw says:

The purpose of rural free delivery is to carry the mails daily—on a fixed line of travel—to people who would otherwise have to go a mile or more to a post office to receive their mail. It is required that roads traversed shall be kept in good condition, unobstructed by gates; that there must be no unbridged creeks or streams not fordable at all seasons of the year, and that each route of 24 or more miles in length domiciles 100 or more families. Routes less than 24 miles long are in emergencies established where they cannot be made the standard length, but in such cases a proportionate number of families is required.

In the interest of safe and economical administration it is recommended that a possible patronage of 100 families on a standard route of 24 miles, or a proportionate number of families on routes of less length, and that roads in good condition, unobstructed by gates, with all streams fordable at all ordinary seasons of the year, should be made by law conditions precedent to the establishment of rural free delivery service; provided that in completing service in a county the average patronage per route may not be less than 90 families; and further, that service on rural routes be limited to one delivery and one collection daily, to be made at the same time.

Where service has been established on petition for individual routes, it is found that after the most careful planning in laying out the service there are here and there sections of available territory without it; the completion of service under such conditions is taken up by counties, and has come to be known as "county service." In this way practically the entire rural population of a county is given the benefit of daily delivery. This work, considering the expense involved, is confined to territory where it is found that existing service is fully appreciated and where other conditions are favorable to successful operation. On June 30, 1905, county service was in operation in 283 counties, having been installed in 134 counties during the year. Since that date orders have been issued for the inauguration of service in 62 additional counties.

In Recapitulating the Recommendations

of the Postmaster-General and his three assistants it appears that the proposition for the establishment of a domestic parcels post is opposed chiefly on the score of cost; that the plan for the consolidation of third and fourth class mail matter, thereby providing a merchandise rate of 8 cents per pound, is strongly favored; that the Bristow scheme authorizing a species of parcels post on rural routes is advocated by the Fourth Assistant Postmaster-General, but not by his superior officer, Mr. Cortelyou; and that both the Postmaster-General and the Fourth Assistant are disposed to adopt a far more conservative policy with respect to the extension of the rural free delivery service than has heretofore been followed.

W. L. C.

AVERY STAMPING COMPANY.

THE AVERY STAMPING COMPANY, Cleveland, Ohio, has just issued catalogue No. 2, which shows that the company makes a full line of Cleveland Pattern Hollow Back Dirt Shovels, Spades, Eastern and Western Pattern Scoops and patented Plain Back Shovels and Spades; also Special Locomotive Firing Scoops, Gashouse Charging Scoops, Furnace Scoops, Brass Scoops for special purposes, Galvanized Shovels and Scoops for salt works, Perforated and Galvanized Scoops for handling crushed ice, Ore Shovels, extra heavy Tamping and Plain Handled Railroad Track Shovels, Molders' Shovels, Steel Snow Shovels, Ash Shovels, Sidewalk Cleaners and Post Hole Diggers. The catalogue gives illustrations, dimensions, weights, special list numbers, as well as list prices of sizes, styles, patterns, brands and grades and finish.

CALIFORNIA HARDWARE COMPANY'S NEW CATALOGUE.

THE CALIFORNIA HARDWARE COMPANY, Los Angeles, Cal., has just issued its first general Hardware catalogue. It is of the loose-leaf style and contains about 900 pages, each 10¾ x 9⅝ inches, which, however, are paged to 1100, thus allowing for future inserts. Illustrated and described are large assortments of Builders' and Shelf Hardware, Cutlery, Table Ware and Housefurnishing Goods, Ammunition, Mining, Mill and Blacksmiths' Supplies, Mechanics' Tools, Pipe Fittings and Steam Goods, Metals and other kindred merchandise. The book reflects much credit on the company and will doubtless be appreciated by its many customers.

TRADE WINNING METHODS

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

WINTER SCENES FOR THE SHOW WINDOW.

BY F. B. M.

SKATES

A man may be Strictly Temperate and yet have a "SKATE ON."

WE keep LOCKS with KEY Holes suitable for this kind of SKATE.

THE other kinds of SKATES we are allowed to sell to minors, both Boys and Girls.

THE above show card is for Skate season, which is close at hand. If you wish to make this the "banner year" and sell more Skates and Sleds than ever before, then you will be interested in trying what I have to suggest. Having endeavored to draw a picture in type that is so clear as not to require further explanation by the employment of cuts, it is thought that you will have no trouble in understanding and carrying out the designs and it is expected that the missing illustrations for this article will be on exhibition in many a show window, where the children can enjoy what you have wrought as well as the presents they have bought. You should begin work on the designs as soon as possible, so as to have everything in readiness at least two weeks before Christmas. The first requisite for this design is

SNOW SPARKLE,

probably obtainable from stationer or supply house, but in case you cannot always obtain the article above referred to I will mention a good substitute—i. e., marble dust made by powdering up a few chips of white marble with a hammer. You can find the chips at any marble yard and should exercise care in selecting them, only procuring perfectly clean pieces and of the more crystalline formation of marble, so that the dust will sparkle like snow, either in the sun or under artificial light. The effect must be both natural and beautiful.

Having secured the "snow sparkle" or else the marble dust, the next step is to "corner the cotton market," but in this case you will not have to go to Wall Street to obtain the necessary article. Enough cotton must be purchased to make your show window look as if it had been struck with a genuine blizzard. Then in order comes a

MINIATURE SKATING POND.

To form this take a large sized looking glass (oval shape is preferable) and the larger the mirror the greater and more attractive your window will become. Taking for granted that the mirror is now ready for its important part in the play, the next procedure is to transform the mirror into a sheet of ice. This is accomplished by dulling it with whiting, which will not damage the glass. The whiting should be applied very thinly over the entire surface until it has the exact semblance of ice. If you do not get it the first time rub off the whiting and try it again. This being accomplished, place the mirror right side up, flat in the window, covering the surrounding flooring with valley, hill and dale formed out of cotton, the cotton also serving the purpose of covering from view the frame of the mirror and forming the shore or border of the lake. This should be very irregular, and the quicker and rougher made the more true to nature it will appear. A toy house in the background with the roof covered with cotton will add greatly to the scene, and if this is done stain some cotton with ink, just the color of smoke, and have it coming out of the chimney.

There is no limit as to what may be done, but I must leave it for you to further elaborate upon the subject. Be sure and get some sprays of cedar or Christmas greens to use for small trees here and there to contrast with the snow. These can be made of green tissue paper if necessary. Stick on the sprays of green, or more properly speaking the tree tops, little pieces of cotton to represent snow laden boughs. Now sprinkle the "snow sparkle" over all to give a frost like effect to the cotton and the scene is completed except for the

SKATERS ON THE POND,

which can be made by using paper dolls arranged in positions as if skating. They may be fastened to the glass so as to stand up by the use of flour paste to which a few drops of glycerin has been added, which will make it adhere to the glass. Of course the whiting has to be removed only from the exact spot where the doll is pasted. If you can spare two windows for the design, then place a

COASTING SCENE

in an adjacent window, suggesting the sale of Sleds. Cover the window glass with cotton by pasting on it tiny particles, none larger than a snow flake, being careful not to place them too thickly on the window pane or else you will obstruct the view of the scene back of it. Also, be sure to drop the flakes of snow as it were across the glass at an angle of 60 degrees so as to give the appearance of the wind blowing the snow. In the center of the window against the glass put the following show card:

SLEDS.

AS back of the cloud is the Sun

SO back of the Snow is the Sled

AND back of it is our REPUTATION.

In this window form a hill out of a board. Half way up fasten to the board by means of twine and screw eyes a good sized Sled taken from stock. Take a

SUIT OF SMALL BOYS' CLOTHING,

button the coat and fill with excelsior, leaving quite a bunch sticking out at one end for the head. Tie over this a false face, and put on a skating cap to cover up perfectly the back of the head. For the hands stuff mittens full of cotton and pin fast inside the sleeves, which have already been filled with excelsior. Use heavy yet pliable wire for stiffening the limbs, stuff the trousers full of excelsior, also the stockings, then lace or button on the shoes. Now stick a piece of wire through each leg of the trousers and up into the excelsior in the coat so as to connect the body, letting the two other ends project far enough to run through the center of the stuffing in the stockings clear down to the shoes.

THEN PLACE THE BOY ON THE SLED

in a natural position, lying on his stomach, with his head and part of his body raised, his hands braced against each side of the sled and one foot straight out and hanging down until it drags, as if steering, the other foot thrown back over the body, as a boy so often does when coasting, and you have a doll that you could not buy at a toy store for $15. All that now remains to be done is to fasten the boy on the sled with thin twine or wire so that it will be invisible, and complete the design by covering the board with cotton batting and using loose cotton for the balance of the snow scene, covered with "snow sparkle" and interspersed with fair sized Christmas trees for background, according to taste and judgment.

A BOOKLET ON THE CONDUCT OF THE HARDWARE BUSINESS.

"THE BUTLER WAY," Hardwaremen's edition, will be issued about the first of the year by Butler Bros., New York, Chicago and St. Louis, a wholesale mail order house differing from the so-called catalogue houses in that it deals exclusively with merchants and has no retail trade. It is a booklet which will be found to contain a large amount of matter of exceptional interest and value to merchants generally, especially Hardwaremen, for whom it has been particularly designed. It is full of pointers and suggestions for the enterprising and aggressive conduct of the retail Hardware business. The methods and principles laid down are recognized as correct and up to date and are pretty sure to light the way to success if consistently followed. For example, referring to the desirability of the merchant carrying everything that might reasonably be included in his stock the booklet has to say, in part:

The tendency of customers to trade with you is your greatest asset. You are making the most of this asset only when you are coming the nearest to supplying all the wants of your customers.

So long as you continue to force customers to go elsewhere for an article they reasonably expect to find in your store, you are failing to improve your opportunities to the utmost. Besides, every time you tell a customer that you do not handle an item he has called for, by thus forcing him to go elsewhere you are helping your own customer to form the habit of trading at another store.

Sort up your stock, get a greater variety, do business the way people want it done whether that's the way you prefer or not, and begin at once to enjoy some of the larger trade that is yours for the trying.

Again, touching on the importance of keeping goods in sight, the following extract will be of interest:

Unless you want to invoice over and over again goods that do not sell, come as near as possible to showing everything you have.

People nowadays buy a great many things on sight which they did not have in mind at all when they left home.

They cannot buy on sight in your store unless they do see your goods. If you keep your wares way up near the ceiling in dust proof boxes, don't be disappointed because they stay there.

Get your goods down, make looking easy, put price tickets on everything, make the whole store inviting. Get out the old goods, dust them off and clean them thoroughly, and then put them where they will be seen by people who will be likely to want them

Do not wait to be asked if you have a thing. Put it out where it shows—where the question will be answered before it's asked. And put a price ticket on it to forestall, too, that other question as to cost.

Shelf Hardware up too high to be seen becomes shelved Hardware, and shelved goods are profit eaters.

Much is said on the subject of store and stock attractiveness, from which we take the following:

Make your stock attractive. Make your whole store attractive. People generally like that way of storekeeping well enough to go blocks out of their way to buy even a trifling thing where goods are kept in nice, clean, attractive style and where customers are made to feel at home and to understand that their business is appreciated.

Be sure the customer is made to feel welcome immediately upon entering, and let no one leave feeling anything but pleased with the treatment all get in your store. Note that we say "the treatment all get," for unless it is a regular thing for the owner and for every clerk to be polite and agreeable the atmosphere of the store will repel instead of attract.

A good deal is said about effective window advertising, of which the following is a part:

As by good advertising we mean nothing impossible to the average Hardware dealer in the average town, so by good window display we do not mean the kind that demands an expert window trimmer.

As a matter of fact, the simpler the display the more effective the window is likely to be. Frequent changes are necessary to keep the window interesting and simple displays are more certain to be changed often than elaborate ones.

Besides, in the elaborate displays there is always the probability that in trying to bring out many points no one point is brought out strong enough to make more than a fleeting impression.

It is the eye, remember, to which you apeal with a window display, and your story must be told to those who, so to speak, are on the run.

Another chapter has to do with printed matter and newspaper advertising, from which the following extracts are taken:

Printed matter that will sell goods is not as hard to produce as some self styled experts would have you believe. Most of the so-called expert advice is little more than empty generalizing about nonessentials.

It is not literature, remember, but advertising that you want to write. Knowledge of words and type and the ability to write fine introductory talks and striking headings are not to be despised, of course. But facts and not ways of saying them are what induce people to spend their money.

Your knowledge of your store, your goods and your people is more than an offset for any lack of ability to coin catchy phrases or to use technical language in telling the printer how you would like to have your advertisement look. The brilliant effort of the "expert" who cannot talk horse sense about your goods and prices is worthless in comparison with the poorest home-made description of what you offer and how much you will take for it.

Get rid of the impression that there is anything mysterious or impossible about the subject. Believe that, so far as it applies to your store, the mastery of advertising is easily within your power. Go at it without any feeling that advertising is more than the use of printer's ink in place of your voice in the sale of your goods. Then, knowing your own store, the kind of printed matter you will have to rely on and about how much you have to spend, work out the advertising problem as it is for you.

* * * * * *

To make the most of the time, money and effort you devote to your advertising, lose no chance to get the full benefit of each general move you make.

Every time a newspaper advertisement you use strikes you as particularly good, tell the printer to use the same type for some circulars to be mailed or otherwise distributed. Thus you secure circulars and newspaper advertisement at the cost of one setting of the type.

If the newspaper advertisement or the part of it that seems good enough for the purpose is too small for a circular have it held until enough other matter in type has accumulated to make in all a circular of the size and kind you do wish to use.

Make your circulars, letters, &c., supplement your newspaper advertising and repeat the story they tell in your show windows. By thus making all forms of your general outside advertising work together results will be greatest.

In newspapers, circulars, &c., as in show windows, present something new often enough to avoid staleness, which in the eyes of the modern public is the unpardonable sin in storekeeping.

The competition of the retail mail order houses and how to meet it is discussed in another chapter, a few paragraphs from which are given below:

The chief reason for the success of the retail mail order houses is that local retailers have not worked as hard to improve their advantages as the retail mail order men have worked to overcome those advantages. For, as a matter of fact, the balance of advantages is in your favor.

That you may not think so is a tribute to the skill of the retail mail order men in their use of words to convey just that impression. Doubtless the one overwhelming advantage you think they possess is the ability to quote lower prices. Is that ability theirs?

* * * * * *

And to think that the retail mail order houses sell the bulk of their wares cheaply is to forget—as they would have every one forget—how impossible that is, considering how much it costs them to do business. High rents, city wages for clerks, an infinity of detail—all these force their ratio of expense up beyond that of any well conducted retail store. And to cap all, advertising as they are compelled to do it adds a straight 10 per cent.

Frequent reference is made throughout the booklet to the desirability of cultivating the trade of the fair sex, and many convincing reasons are given why it pays.

The booklet contains 20 chapters, 72 pages in all, and is also freely illustrated with sketches of simple and effective racks, stands, counters, shelving, &c., for the display of goods. Butler Bros. will be pleased to send a copy of it to any Hardwareman on application.

WESSEL, DUVAL & CO.

THE firm name of Beéche, Duval & Co., export merchants, 25-33 Broad street, New York, and Valparaiso, Chile, has changed to Wessel, Duval & Co. Mr. Beéche, owing to impaired health, has ceased to be an active partner, but continues as a special partner. P. M. Wessel, who now heads the firm, has been for many years chief special partner and at one time was actively engaged in the business at Valparaiso, where he is well known. Otherwise the *personnel* of the firm is unchanged. This business was established in 1828 by Augustus Hemenway in Valparaiso and until about 15 years ago the chief office in this country was in Boston, the firm in later years being known as Hemenway & Browne. They operate their own line of steamers to the West Coast of South America, known as the West Coast Line, which carries largely the firm's own shipments, but general cargo is also taken. The house is a large buyer of American manufactured products and such staples as Kerosene, Rosin, &c.

IMPLEMENT DEALERS IN CONVENTION.

THE seventh annual convention of the Retail Implement Dealers' Association of South Dakota, southwestern Minnesota and northwestern Iowa was held at Sioux Falls, S. D., on the 12th, 13th and 14th inst. K. O. Stakke, Woonsocket, S. D., president of the association, called the convention to order. Judge H. H. Keith, representing the Mayor of Sioux Falls, delivered the address of welcome, the response to which was made by E. F. Gross of Gettysburg. J. E. McDougall of Britton, Lieutenant-Governor of South Dakota and for some years an Implement dealer, was then invited to address the convention, after which a formal address was made by H. F. Kinney, Winona, Minn., representing the National Association of Implement and Vehicle Manufacturers.

President's Address.

President Stakke's annual address was delivered on the afternoon of the 13th. We give the following extracts from it:

Only a few years ago a few dealers read the handwriting on the wall, took time by the forelock, organized an Implement Dealers' Association, taking for a foundation principle "United we stand, divided we fall," and the hand of this protecting principle of association work has left its mark ever since all along this line. I think that all of you who are here indicate by your presence that you believe that the interpretation of the handwriting on the wall at that time was correct and the signs of the times are that this protecting hand is needed more than ever. The intensity and earnestness of a few will not do the work that is to be done. It is absolutely necessary that all implement dealers become members of the association and in that way effectually aid in making the undertaking a complete success.

USE THE GRIEVANCE COMMITTEE.

One trouble comes to our notice. Dealers will stay at home and growl because they observe that certain houses make direct sales, and some have sold to illegitimate dealers and forget that we have a Grievance Committee, and that Uncle Sam for a two-cent stamp carries such news if you only give him a chance. Make your complaints to the Grievance Committee instead of whining to yourself, saying that the association officials have left the bars open and you lost the sale of an article in your line. Again, no Implement dealer has a right to ask for any protection unless he is a member of the association. One dealer does not owe the other any protection unless they are on equal footing and reciprocity is assured between them.

Let us have our membership fee sufficiently large so that we can make things hum. I fear that a great many do not realize what it costs to run the association, if run right, and while you ponder over this matter of expense do not forget other branches of this work, the National Federation, without which we lose 75 per cent. of power from our association. You understand that by the National Federation all the various associations are banded together and made into a national power, and you can readily see the need of this.

MUTUAL INSURANCE.

We are yet without an insurance company within our association. This is a matter of great importance. Certainly insurance can be carried cheaper on the Implement business of the country than on any other business of equal importance in this country, and at present we pay the same rate. It would also add largely to the good derived from the association. Enough could be saved in this way to many times pay the association dues.

Report of the Secretary.

W. S. Hill, secretary of the association, followed Mr. Stakke with his report as secretary, which was in part as follows:

The past year has been one unsurpassed in prosperity for the farmers of the Northwest. Abundant crops, coupled with high prices for all farm products, have enabled our customers to be good buyers. In this general prosperity the Implement trade has shared to a greater or less extent. The prospects for trade the coming season indicate a greater volume than has perhaps ever been experienced.

IS THE IMPLEMENT DEALER GETTING HIS FULL SHARE

of the present prosperity? Without wishing to be pessimistic, I believe I can say that the business does not render the amount of gain it should. I do not wish to be understood as saying the Implement trade generally is not prospering, because it certainly is in a prosperous condition. But is it paying the net profit it should, when the capital invested, effort put forth and ability necessary to carry on such a business is considered? Will it compare favorably with other lines of trade, such as lumber, grain, banking, &c.? I hardly think it will as conducted at the present time.

TOO LONG CREDIT.

There are several things that prevent the business from being what it should. Some of these things can be overcome by the dealers and some cannot, at least not entirely. Goods are sold on too long credit. The farmer no longer needs the long time he once needed and the extending of such long credits has become a habit that should be broken. The dealers have it within their power to regulate this.

The margins of profit seem to get narrower each season. This is a matter that the dealers can only partially overcome. The increasing number of towns and consequent increase in the number of dealers materially reduce the tributary trade, which is equivalent to a reduction in volume of business done. By being alive and taking hold of new Implements as they come into demand and adding side lines the dealer can many times keep his volume up even though his territory has become restricted.

LOCAL ORGANIZATIONS.

Your officers have the past year made an effort to have local organizations formed at convenient points in our entire territory. In this we have been but partially successful. A few locals have been formed and with the very best of results. It is to be sincerely hoped that more of these locals will be formed and those already started be kept alive. From experience I can say that the time and trouble incident to the formation of these locals most certainly pay and pay well. A uniform set of by-laws may be had from this office to aid in their organization. I cannot urge this too much and certainly hope this convention will take definite action in reference to it.

CATALOGUE HOUSES.

The evils that the great catalogue houses are working upon the retail trade are great and our association should combat them in all possible ways. The building up of these gigantic concerns in distant Eastern cities at the expense of our small towns will most certainly prove disastrous to the welfare of the country at large. This question, together with parcels post, which is being pushed by the great catalogue houses, should receive our attention and action at this meeting. At the present time the question of the adoption of a parcels post is being urged by the catalogue houses and their interests. It behooves us to be alert. Appeals should be made to our Representatives in Congress both by petitions and personal letters.

Mr. Hill, who is also treasurer of the association, made his annual report as treasurer. This showed the association to be in a prosperous condition. A number of new members have been added during the year.

Views of a Traveling Salesman.

Fred J. Vetsch of Sioux City, Iowa, representing the South Dakota Traveling Men's Association, addressed the convention on the subject of "We Must Win the Battle." Mr. Vetsch spoke in part as follows:

The South Dakota Traveling Men's Association is an organized body of salesmen traveling within the State of South Dakota regardless of their place of residence. We celebrated our first birthday last May at Watertown. One of our aims is to place the traveling salesman on a higher standard before the public, before his community and before his society, not only in a commercial way and socially but also morally.

It might be said salesmanship to-day is a science. It is necessary that the salesman's appearance and manner of address be inviting, that he present his goods in an intelligent way, that he be convincing in his statements by having a thorough knowledge of the goods he has to sell and be strictly honest in his dealings. One of the prime objects of our association is to co-operate with the different retailers' associations of the State to fight the battle for our livelihood. Our interests are mutual—what hurts the retailers' business affects our sales; what helps his trade means added sales and profits to our houses and to ourselves. Traveling salesmen by virtue of their position in trade can wield a strong influence toward abolishing irregular methods in business.

THE THOUGHTFUL SALESMAN

realizes that the interest of his house and himself can best be served by protecting the legitimate retail dealer. It is the dealer's trade that his employers desire; they do not send him out to travel from place to place and sell any and everybody, nor do they instruct him to ignore the dealer. On the contrary, he receives instructions, that are explicit and clear, that he solicit the legitimate deal-

er's business only. The salesman who disobeys their instructions loses valuable business thereby, jeopardizing the interest of his firm and his position, and in most cases is summarily discharged.

MODERN BUSINESS METHODS.

After some days of study and reading on the question of how to bring about a healthier condition of the retail business and keeping the retailer's business at home, I find that all trade journals in trying to bring about this condition do not attack illegitimate competition but try to get the dealers to a higher development of business methods. In the struggle for business the quality of goods, the price, prompt service, courteous treatment—all can be made to have weight with the buyer. A clean, well displayed stock, a clean office and storeroom and always on the alert and lookout for business will help to overcome unfair competition.

LOCAL MERCHANT HAS AN ADVANTAGE.

Say what you will, it seems to me that the local merchant in his nearness to the trade where he can come in personal contact with every customer has an advantage the mail order houses can never overcome as long as the home merchant is up to snuff and after business.

Of course if the merchant goes to sleep or is not as active as he should be his competitor will get in his work. Have a thorough knowledge of what you have to sell, have some intelligent understanding of how your goods are made, and you can then make a comparison with poor and good goods, with cheap and high priced goods.

ADVERTISING

is a very important feature in securing business. Do not expect to get all the business, but bombard the whole family with fresh advertising frequently; advertise as much as you can possibly get people to read.

Don't "roast" your competitor in your advertising; you confess to the public that he is getting your business; therein you elevate your competitor in the estimation of the public. No matter what your competitor does, paddle your own canoe. Make it a point to talk favorably of him rather than otherwise. There is money in that policy; there is loss in the other. Last but not least, get together; don't despise and treat your competitor with a cold shoulder if he makes a dollar.

COMMUNITY OF INTERESTS.

Every town should have its periodical meetings of *all* the business men. If a commercial club cannot exist have a business meeting, discuss the ways and means by which the town and its dealers can draw and keep their trade at home.

The commercial world has been revolutionized by the community of interests plan and through this competition has been eliminated. You can in your own measure apply this in your own town. I do not advocate the abuse of power that follows the combination of business and capital, but it is only just and for protection to use it in a square deal way.

National Federation Report.

In his report as delegate to the National Federation M. D. Thompson of Vermillion stated that after four years' constant effort the Federation had been successful in securing a concession from the National Association of Implement and Vehicle Manufacturers providing for the payment by manufacturers of transportation charges on all parts shipped to take the place of defective ones. He also referred to the proposed change in the classification of vehicles in less than carload lots. The change as proposed would reduce the freight one-third on all less than carload shipments of vehicles in the Western classification territory, which embraces the entire United States west of Indiana and the Ohio and Mississippi rivers. The question to be decided by the dealers, Mr. Thompson said, is whether or not they consider this change desirable, for no doubt the Western Classification Committee would be influenced by the opinions of the dealers if expression is given to such opinions in a manner that will reach the committee.

Resolutions.

The Committee on Resolutions reported the following among other resolutions which were unanimously adopted:

Whereas, Some manufacturers and wholesalers of Farm Implements, Vehicles, Wind Mills, Well Supplies and other goods sold to the retail Implement dealers are in the habit of selling or quoting prices to parties not established dealers; therefore, be it

Resolved, That such manufacturers and wholesalers be asked to sell goods only to regular Implement dealers, as listed by the secretary of this association, and in case any manufacturer or wholesale dealer shall disregard this request we, the Retailers' Association, hereby pledge ourselves, each and every one of us, upon request of the Grievance Committee of this association, not to buy any more goods from such manufacturer or wholesale dealer who shall disregard this request.

Whereas, The best interests of the people of this country require entire freedom of thought and action, not conflicting with the rights or privileges of others; therefore, be it

Resolved, That we condemn the attempts of manufacturers and jobbers to restrict the privilege of the retail dealer to select such goods for his trade as to him seems best for his section and most suitable to his customers.

Whereas, We are informed that the Railroad Classification Committee contemplates an increase of the minimum weight applying to carload shipments of Implements and Vehicles,

Resolved, That we protest against such possible action as unjust to the members of this association and request that no change be made in the present schedule, and request further that the minimum rate of carload Wire shipments be placed at 24,000 pounds.

Resolved, That we do not favor the custom in vogue by manufacturers of Harvesting Machinery of assigning canvassers to solicit business in the rural districts, and we demand that the wholesale price of Harvesting Machinery, Mowers and machine repairs be materially reduced.

Whereas, The Parcels Post bill will make the business of the merchants in our country towns unprofitable, and thereby destroy those towns; therefore, be it

Resolved, That we, the Retail Implement Dealers' Association, put forth our best efforts, both individually and through our association, to impress upon our representatives in Congress the necessity of defeating said bill.

Resolved, That such manufacturers of Threshing Machinery and supplies as sell direct to customers are asked to market their goods through regular Implement dealers only, and we hereby pledge ourselves, each and every one of us, upon request of the Grievance Committee of this association, not to buy any more goods from manufacturers who disregard this request.

Resolved, That this association urge the Western Classification Committee to make no change in the L. C. L. classification on Vehicles, as it would work to the injury of all retail dealers in our association.

Whereas, Some manufacturers have been in the habit of quoting net prices in circulars or trade papers; therefore, be it

Resolved, That such manufacturers be requested to discontinue such publications.

Whereas, The best interests of the dealers and consumers in every section of the country depend upon a friendly feeling toward each other; be it

Resolved, That we recommend that local associations be organized, thereby becoming connected with the State association and National Federation.

Whereas, After four years of constant effort the National Federation has succeeded in securing the concession from the National Association of Implement and Vehicle Manufacturers providing for the payment of all freight and express charges on parts shipped to take the place of defective ones; therefore, be it

Resolved, That this association tenders its thanks to the National Federation and to M. D. Thompson, our delegate to the National Federation, for their efforts in this important matter.

Resolved, That we are in hearty sympathy with President Roosevelt in his demand for railway rate supervision and request our representatives in Congress to give to the President their hearty co-operation.

New Officers.

The following officers were chosen for the ensuing year:

PRESIDENT, L. V. Schneider, Salem, S. D.
VICE-PRESIDENT, O. E. Mesick, Gettysburg, S. D.
SECRETARY-TREASURER, W. S. Hill, Alexandria, S. D.
DIRECTORS: For one year—A. E. Cole, Vienna, S. D.; W. H. Wumkes, Lennox, S. D.; For two years—H. E. Meyer, Lake Park, Iowa; B. G. Wattson, Chamberlain, S. D.
LEGISLATIVE COMMITTEE: M. D. Thompson, Vermillion, S. D.; J. E. McDougall, Britton, S. D.; J. H. Roper, Parker, S. D.; C. Rempfer, Parkston, S. D.; J. E. Sinclair, Beresford, S. D.; G. W. McLaughlin, Highmore, S. D.; E. F. Gross, Gettysburg, S. D.
GRIEVANCE COMMITTEE: W. S. Hill, Alexandria, S. D.; E. D. Van Alstine, Mitchell, S. D.; W. Higginbotham, Centerville, S. D.

By unanimous vote Sioux Falls was again selected as the place for holding the next annual convention, and December 11, 12 and 13 was fixed as the time.

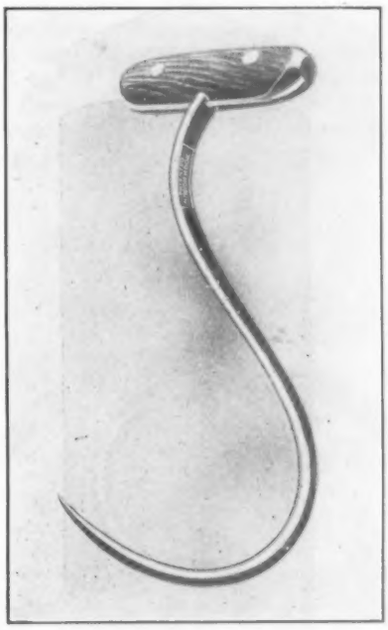
W. R. W. Drop Forged Snips.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York, has just added to its line of tinners' hand shears one that is drop forged, with steel laid blades, black handles and branded W. R. W. It is offered at a less price than the P. S. & W. brand, the company's finest quality, but is referred to as of high grade. The straight snips are numbered consecu-

tively from 46 to 50, inclusive; the circular snips running from 47 to 50, inclusive. The length of cut is from 4¼ to 2½ inches and the list prices are the same as in the best or P. S. & W. grade. The goods are especially well packed, being first wrapped and then placed singly in a rectangular, double paper covered box, neatly labeled on both top and end, thus making a good shelf article and keeping the snip in salable condition.

Union Box Hook.

Patterson, Gottfried & Hunter, 146-150 Centre street, New York, are marketing the patented Union box hook here illustrated. Hook and handle are drop forged from one piece of steel, the wood scales or handles after being water proofed and stained a reddish color being fitted into pockets in the handle and riveted securely. The handle is oval shaped, 1⅝ inches wide, and provides a perfect grip for the hand. The metal portion of the handle is enlarged at each end, forming hammer faces, which not only serve to protect the wood sides but are serviceable for driving nails when box, barrel or keg needs coopering



Perfect Handle Union Box Hook.

in transit. The hook is 12 inches long from handle to curve of hook and the handle 5½ inches from end to end. The point is ground and tempered, all metal parts polished and the hook is fully warranted.

The Geetzy Air Moistener.

An air moistener has been brought out by the Geetzy Company, 211-213 Madison street, Chicago, for maintaining indoor humidity at a proper degree. The moistener is manufactured for attachment to radiators, steam pipes, side wall registers and stoves. It consists of a galvanized iron reservoir of 2 to 6 quarts capacity fitting close to the heating apparatus to which it is attached in order to secure the full evaporating effect of the heat on the water contained therein. It is equipped with a set of perforated braces or sockets at either inside end. Into these sockets is set a copper wire frame which makes a rack extending lengthwise of the moistener. After wetting it the evaporating sheet, made like a roller towel, is thrown over this frame and the ends of the sheet extend down into the moistener. By capillary attraction the water is sucked out of the reservoir over the surface of the evaporating sheet. When soiled the sheet may be rolled around until a clean portion is exposed. To keep the sheet in a sanitary condition the company offers in connection with the moistener what is known as Formazone. The reservoir is provided with wires by which it is attached to the radiator, stove or other type of heater. The reservoir is filled through openings on the side. Where the moistener must be attached to the front of the radiator the perforated shield attachment hides the

The Geetzy Air Moistener.

evaporating sheet from view. The moisteners are furnished with gilt, aluminum and bronze finish.

Asbesto-Carbon Water Filters.

The Asbestos Specialty Company, 478-480 Pearl street, New York, is just marketing a line of high speed

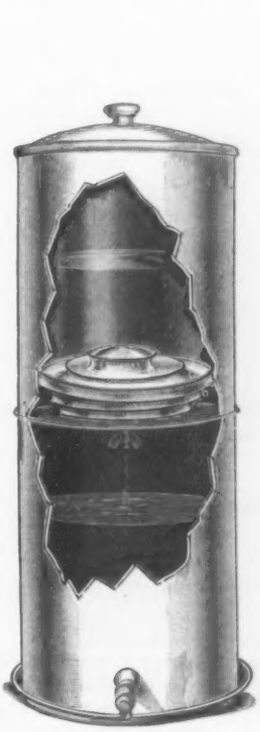


Fig. 1.—Asbesto-Carbon Filter, Two Vessels.

Fig. 2.—For Filtering Cooled Water, One Vessel.

Asbesto-Carbon water filters, types of which are here shown. In principle the same filtering process is used

throughout, the various modifications for domestic, stationary and tourists' pocket filters merely adapting the filtering medium to varying conditions. This system is the invention of E. Knight, specialist in mechanical filtration, who has invented and manufactured water filters for a quarter of a century. The new filters shown herewith and recently patented are being made under Mr. Knight's supervision. Figs. 1 and 2 illustrate portable filters, similar in character, for domestic or office use, Fig. 3 reproducing the filter holder with parts detached. Fig. 1 represents a leading style, consisting of two 3-gallon vessels of indurated wood fiber, placed one above the other. In the upper one is the film holder or filter and the water to be filtered. The lower jar is a reservoir for filtered water, at the bottom of which is a nickeled, self closing push faucet. A feature of this construction is the light weight and ease with which the parts can be handled, cleansed and filtering film or diaphragm renewed as occasion demands, contingent on the amount of water impurity. This style of filter purifies the water, but does not cool it. At the bottom is a platter of the same material in which the reservoir rests. Fig. 2 illustrates a one-piece vessel of indurated fiber, fitted with a tinned reservoir, flanged at the top to sustain it, having at the bottom a similar filter holder so that both water and ice to cool it can be placed in the upper vessel from which chilled filtered water percolates rapidly into the lower portion to be drawn off through a similar faucet. This construction enables the ice above to keep the filtered supply cool as long as ice remains, as both unfiltered and filtered water are contained in a single fiber vessel. The indurated fiber being a good non-

Fig. 3.—Parts of Filtering Film Holder.

Fig. 4.—Tourist Filter, Cover Raised.

Fig. 5.—Tourist Filter with Tube Attachment, Cover Off.

conductor of heat and cold readily keeps the water cool as well as sweet. These filters can be supplied in plain or decorated finishes and in various sizes. Fig. 3 is a view of the film holder or filtering medium with parts detached, showing in lower part the asbestos film upturned to give a better idea of its relation to the other parts. In the 3-gallon size this film is 8 inches in diameter, and before moistening nearly ⅛ inch thick. The holders are of spun metal, polished and nickeled, although it is proposed to make them of aluminum, hard rubber, porcelain, glass, china, stoneware or other suitable materials as demanded. In the center of the bottom section is a tube through which the filtered water passes into the reservoir below. Next to the bottom is a disk of perforated metal, above which is the asbesto-carbon film. The film consists of two mat-like disks of specially prepared Canadian asbestos, using only the long silky fiber after being freed from the shorter portions and any foreign substance. On the inner sides of the two sheets is spread a coating of finely pulverized charcoal, the purifying and clarifying qualities of which are well known. The center perforated section, with rounded edge, is then forced downward into a crease made to receive it, first moistening the asbestos, when the top cap having sufficient side holes to admit water is securely held in place. In both styles of filters the film holder is fastened to the bottom of upper receptacle by means of a wing thumb nut and rubber washer, making a perfectly tight joint. Figs. 4 and 5 illustrate a pocket filter for travelers, &c., the former showing it complete, but with cover raised, and the latter being another view with cap off and rubber tube attached. This style of filter is 4¼ inches in diameter outside, 1 inch thick and weighs complete with 3 feet of rubber tubing in nickeled copper 8 ounces and in aluminum 4 ounces. In operation the pocket filter can be used as a siphon by dropping it into a pail or other water receptacle and siphoning out as much as is needed for cooking where parties are in camp or tramping, or the individual can by suction get a drink at any time by dropping it into a brook, pond or other supply. The films for this style are put up in a tube containing 64 to the pound, being packed with a tape zigzagged back and forth as put in so as to readily remove one by lifting tape or cord. Fig. 6 reproduces another adaptation of this system for filtering water direct from the service pipe. In this instance the filter is connected permanently, and the flow of water is automatically controlled by ball valve or float, which instantly admits more water as filtered water is withdrawn below. The filtering films range, as now made, from 4⅛ to 15 inches in diameter, the larger ones being used in the stationary filters. In the filters permanently connected the filtering mechanism is suspended in a circular frame and the water to be filtered enters from both sides, the discharge being through a tube at the bottom into the reservoir.

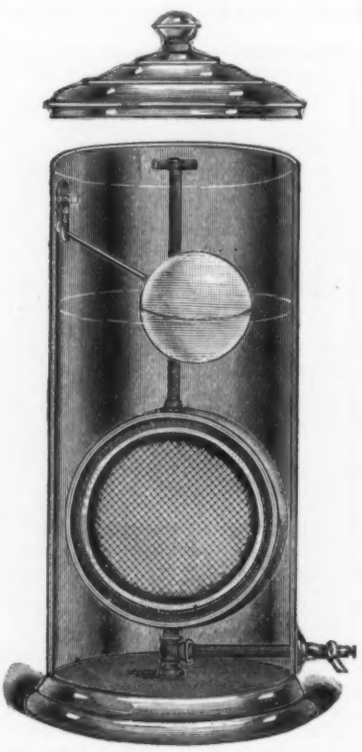


Fig. 6.—Permanent Filter Connected to Water Service.

Peerless Garment Closet Sets.

The Neal & Brinker Company, 18 Warren street, New York, has recently brought out the Peerless garment hangers or closet sets here illustrated. The function of these hangers is to economize closet space and keep suits for both men and women properly suspended. This mode of hanging preserves form and shape, permits ventilation and prevents wrinkling, at the same time keeping a suit—*i. e.*, coat, vest and trousers, or waist and skirt—together on one hanger. With both styles of hangers a closet bar is furnished to be screwed to inner side of closet door, or, if preferred, can be fastened to closet wall. The bar is 15 inches long and at intervals of 2¼ inches there are six grooves in the bar to receive a hanger hook, thus preventing any tendency to slide and maintaining a proper distance between suits. Fig. 1

Fig. 1.—Peerless Suit Hanger for Men.

Fig. 2.—Hanger for Women's Garments.

shows the hanger for men's suits partially open to receive the bottoms of a pair of trousers, which are suspended full length, waist downward. On each of the inner sides of the hanger are felt strips, four in all, to grip the cloth without marking it, the center space, both sides, being left for side seams. When the trousers are in place the hinged side is held at both ends by wire loops, all of the wood ends being so tapered that the loops properly engage, whether the cloth be of heavy or light texture. Over the circular top vest and coat may be hung, the suspending hook having a recessed curve to accommodate collars without marring cloth. Where there are extra trousers in a wardrobe a good combination for a hanger is a pair of trousers and overcoat. The hanger for women's suits, Fig. 2, accomplishes similar results, but in a different way. Skirts are suspended from the waistband, gravity automatically adjusting the hanger to any band from 18 to 34 inches, inclusive, there being a vertical movement of 4 inches on the offset center rod of the supporting wire so that the spread is controlled by the size of the waistband within limits. Fig. 3 represents a closet bar holding a pair of trousers and a skirt. All metallic parts are thoroughly tinned to prevent rust and the wood is shellac finished. The hangers are sold only in sets of six with a closet bar. The men's set A consists of six hangers and a bar. The women's set C also includes

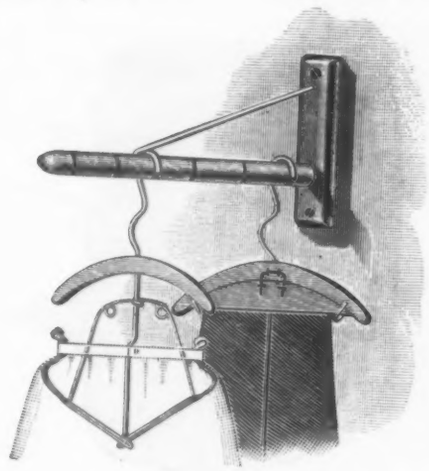


Fig. 3.—Closet Bar with Hangers.

six hangers and a bar. A combination set A C comprises three of each kind of hangers and a bar.

New Lawn Mower Sharpener.

The lawn mower sharpener shown herewith is put on the market by the Osborn Mfg. Company, Cleveland, Ohio. The holder is made of iron with neat, durable

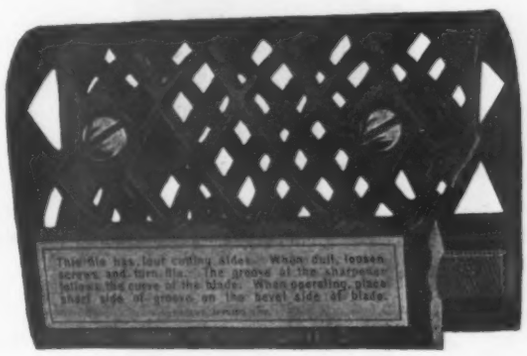


Fig. 1.—New Lawn Mower Sharpener.

"Tucker" bronze finish. The file has four cutting sides, which when worn can be turned by loosening the screws in the holder. The sharpeners are packed in compartment boxes, one of which is shown in Fig. 2, having

Fig. 2.—Display Box for Mower Sharpeners.

hinged cover with neat two-color label, making an attractive display package. The sharpeners are designed to retail at 25 cents each.

O. K. Couplers.

The Lawrenceville Bronze Company, Thirty-first street and Penn avenue, Pittsburgh, Pa., is offering the

Fig. 1.—O. K. Garden Hose Coupler.

new designs of couplers shown herewith. The principal advantage of the coupler is the instantaneous and simple

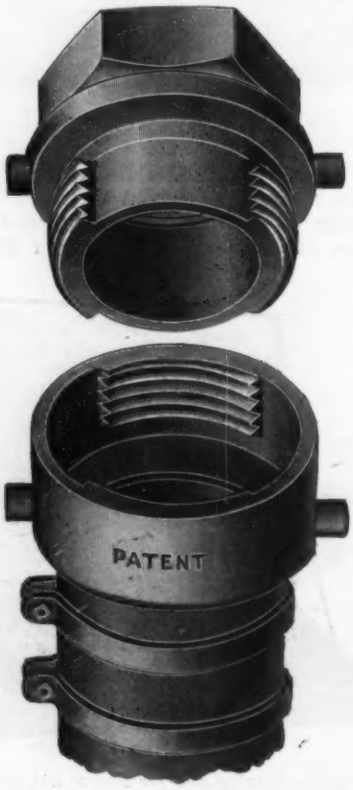


Fig. 2.—O. K. Stand Pipe Coupler.

manner in which the connection is made. The parts are pushed together and given one-half turn and the coupling is made. It is explained that it makes an absolutely tight coupling which cannot work loose under any circumstances. The garden hose coupler, shown in Fig. 1, is made in ¼-inch sizes, from ½ to 2 inches. It is referred to as being especially desirable for use in mills and factories where it is frequently necessary to have lines of hose of varying lengths. In Fig. 2 is illustrated a stand pipe coupler for attaching hose to stand pipes, which is furnished in any desired size. When the hose is disconnected from the pipe the pipe cap covers the mouth of the pipe, protecting it from damage. The coupler is also made for fire hose, water, gas and steam pipes, pipe unions, siphons, &c.

The Bishop Hammer Blow Saw Set.

George H. Bishop & Co., Lawrenceburg, Ind., and Cincinnati, Ohio, manufacturers of hand saws, having in view the proper care of saws, have designed and patented

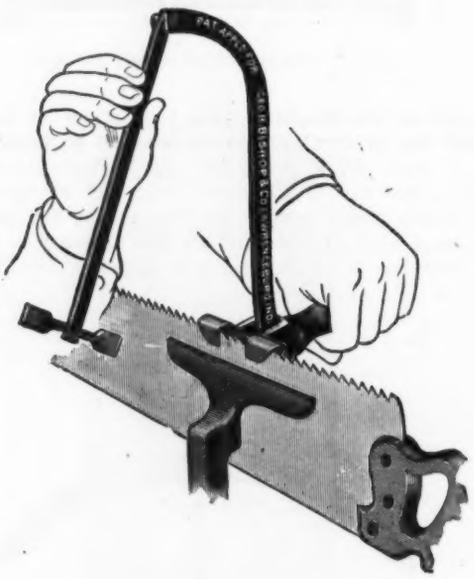


Fig. 1.—The Bishop Hammer Blow Saw Set.

the hammer blow saw set illustrated herewith. It is claimed for the set that all the teeth are set absolutely uniform with just the right pitch without breaking or chipping them and leaving the lower portion of the tooth flush with the body of saw, giving the same smoothness and free running as when new. The degree of set is regulated by the gauge controlled by the wood handle, the stake being firmly set against the tooth and the hammer resting on the tooth before the blow is given to make sure the tooth is in the right position so that the hammer will strike it square. A full swinging blow is given by grasping the hammer arm near the joint, one

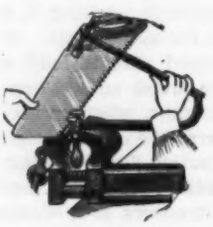
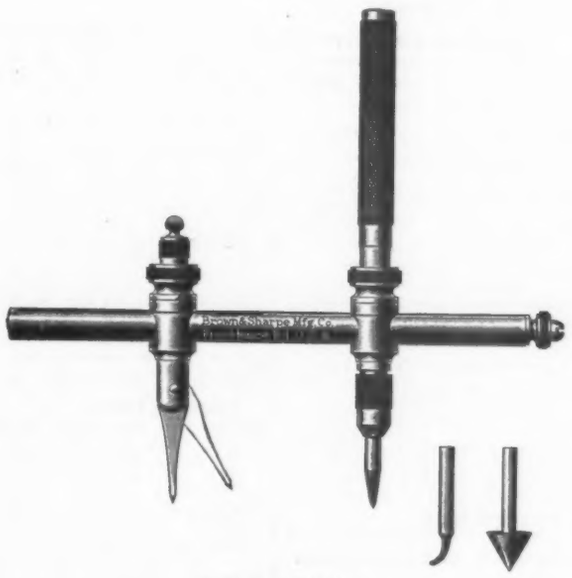


Fig. 2.—Handle of Bishop Saw Set Held in Vise.

or more strokes being given as desired. The hammer is made with a wide and narrow face end to suit either coarse or fine teeth. The entire tool is made of tempered tool steel, nickeled, and is durable. The set weighs 15 ounces, is 9 inches long, put up one-third of a dozen in box.

Universal Dividers.

The scriber point of the Universal Dividers, shown herewith, has both a fine and a quick adjustment, the fine adjustment being obtained by a screw inclosed in the beam, which engages the nut on the scriber point holder. By pulling up the small knurled knob shown at the top of the post the screw is released and the post can be quickly adjusted, the knob springing into place as soon as released. The scriber point is adjustable either side of the center, as shown by the dotted lines, and can be



Universal Dividers.

set for scribing small circles or for working close to a shoulder. The adjustable center point is held by a spring chuck and can be easily removed and replaced by pencil or other special points. The posts are clamped by knurled nuts and held in place by spring friction when the nuts are unclamped for setting the points. A V-point is furnished for use in describing a circle about a hole already drilled. A caliper point is also included. The beam is 4 inches long and the points can be set to describe a circle 8 inches in diameter. The dividers are put on the market by the Brown & Sharpe Mfg. Company, Providence, R. I.

Dandy Handy Tongs.

The Lowell Scale Company, Lowell, Mass., is manufacturing the utensil illustrated herewith, which is marketed under the name of the Dandy Handy Tongs. It is made of steel, nickel plated, a spring being formed at the juncture of the two arms. The notched cross piece shown in the cut is jointed to one arm and governed by a spring,

Fig. 1.—Dandy Handy Tongs.

affording a lock by which the tongs can be fastened together when not in use. The arms have a series of teeth toward the end to give them an effective grip. The tool is said to be adapted to a great variety of uses, among which may be mentioned taking out boiled eggs, potatoes, corn and other vegetables from hot water, taking out doughnuts from the fat and baked potatoes from the oven. It also makes a good dishcloth holder, lamp chimney, jar or bottle cleaner, bread toaster or soap shaker. It may also be used for dusting in awkward places, reaching high shelves, taking clothes from a boiler and for many kinds of sanitary work.

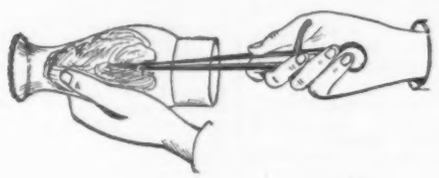


Fig. 2.—Dandy Handy Tongs Cleaning Lamp Chimney.

W. A. Brown, Crooksville, Ohio, has just completed a 60-foot addition to his store and proposes to double his stock of Shelf Hardware, Paints and Sporting Goods.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal.
Linseed, City, raw	.38 @39
Linseed, City, Boiled	.39 @40
Linseed, State and West'n, raw	.36 @37
Linseed, raw Calcutta seed	@62
Lard, Extra Prime, Winter	.64 @65
Lard, Extra No. 1	.49 @52
Lard, No. 1	.38 @40
Cotton-seed, Crude, f.o.b. mills	.22½@23
Cotton-seed, Summer Yellow, Prime	.29 @29½
Cotton-seed, Summer Yellow, off grades	@..
Sperm, Crude	.50 @52
Sperm, Natural Spring	@..
Sperm, Bleached Spring	@..
Sperm, Natural Winter	.60 @62
Sperm, Bleached Winter	.63 @65
Tallow, Prime	.51 @53
Whale, Crude	@..
Whale, Natural Winter	.42 @44
Whale, Bleached Winter	.44 @46
Menhaden, Brown, Strained	.23 @28
Menhaden, Light, Strained	.24 @29
Menhaden, Bleached, Winter	.30 @31
Menhaden, Ex.-Bld., Winter	.31 @32
Menhaden, Southern	.16 @16½
Cocoanut, Ceylon	℔ lb 6½@ 6¾
Cocoanut, Cochin	℔ lb 7¾@ 8¼
Cod, Domestic, Prime	.34 @35
Cod, Newfoundland	.38½@40
Red, Elaine	.30 @31
Red, Saponified	℔ lb 4¼@ 4¾
Olive, Italian, bbls	.58 @64
Neatsfoot, prime	.48 @49
Palm, Lagos	℔ lb 6 @ 6¼

Mineral Oils—

Black, 29 gravity, 25@30 cold test	℔ gal. 10½@11½
Black, 29 gravity, 15 cold test	11½@12½
Black, Summer	10¼@11¼
Cylinder, light filtered	.18 @19
Cylinder, dark filtered	.16 @17
Paraffine, 903-907 gravity	12¼@13
Paraffine, 903 gravity	11½@12
Paraffine, 883 gravity	9¼@ 9½
Paraffine, Red	11½@13

In small lots ½¢ advance.

Miscellaneous—

Barytes:		
White, Foreign	℔ ton	$17.50@19.00
Amer. floated	℔ ton	18.00@19.00
Off color, No. 2	℔ ton	13.50@15.00
Chalk, in bulk	℔ ton	3.50@ 3.75
Chalk, in bbls	℔ 100 lb	....@ .40
China Clay, English	℔ ton	11.00@17.00
Cobalt, Oxide	℔ 100 lb	2.50@ 2.60
Whiting, Common	℔ 100 lb	.43@ .48
Whiting, Gilders	℔ 100 lb	.50@ .55
Whiting, Ex. Gilders	℔ 100 lb	.55@ .60

Putty, Commercial—℔ 100 lb

In bladders	$1.65 @1.85
In bbls. or tubs	1.15 @1.35
In 1 lb to 5 lb cans	2.60 @2.90
In 12½ to 50 lb cans	1.45 @1.85

Spirits Turpentine—℔ gal.

In Oil bbls	.67 @67½
In machine bbls	.67½@68

Glue—

	℔ lb
Cabinet	.11 @15
Common Bone	.7 @ 9
Extra White	.18 @24
Foot Stock, White	.11 @14
Foot Stock, Brown	.8 @11
German Hide	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.9 @12
Medium White	.14 @17

Gum Shellac—

	℔ lb
Bleached Commercial	.38 @39
Bone Dried	.48 @49
Button	.40 @45
Diamond I	@55
Fine Orange	.45 @47
A. C. Garnet	@45
D. C.	.60 @..
Octagon B	@62
T. N.	.42 @43
V. S. O.	.58 @..

Colors in Oil—

	℔ lb
Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.10 @15
Green, Paris	@24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White Lead, Zinc, &c.—

	℔ lb
Lead, English white, in Oil	8½@ 9½
Lead, American white, in Oil:	
Lots of 500 lb or over	@ 7
Lots less than 500 lb	@ 7½
In Barrels	@ 6½
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	@ 1½
Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.	℔ lb.
Lead, White, Dry, in bbls	@ 6½
Zinc, American, dry	4½@ 5
Zinc, French:	
Paris, Red Seal, dry	9½
Paris, Green Seal, dry	10½
Antwerp, Red Seal, dry	8½
Antwerp, Green Seal, dry	10
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over	12¾@13¾
Lots of less than 1 ton	13¼@13¾
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over	11¾@12¼
Lots of less than 1 ton	11¾@12¾

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	℔ lb
Black, Carbon	.5 @10
Black, Drop, American	.4 @ 6
Black, Drop, English	.5 @15
Black, Ivory	.16 @20
Lamp, Com	4½@ 6
Blue, Celestial	.4 @ 6
Blue, Chinese	.29 @32
Blue, Prussian	.27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.50@3.60
Green, Chrome, ordinary	3½@ 6
Green, Chrome, pure	.17 @25
Lead, Red, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 7
Lots less than 500 lb	@ 7½
Litharge, American, bbls	@ 7
Ocher, American	℔ ton $8.50@16.00
Ocher, American Golden	2½@ 3½
Ocher, French	1¼@ 2½
Ocher, Foreign Golden	3 @ 4
Orange Mineral, English	.10 @12
Orange Mineral, French	10¾@12¼
Orange, Mineral, German	8½@10
Orange, Mineral, American	8¼@ 8½
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	℔ 100 lb $0.50@1.25
Red Venetian, English	.100 lb $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9½
Sienna, Ital., Raw Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	1½@ 2
Talc, French	℔ ton $15.00@30.00
Talc, American	℔ ton 15.00@25.00
Terra Alba, French	℔ 100 lb 90 @1.00
Terra Alba, English	℔ 100 lb 90 @1.00
Terra Alba, American, ℔ 100 lb, No. 1	.70 @80
Terra Alba, American, ℔ 100 lb, No. 2	.60 @65
Umber, T'key, Bnt. & Pow	2½@ 3½
Umber, Turkey, Raw & Pow	2½@ 3½
Umber, Burnt, Amer	1½@ 2
Umber, Raw, Amer	1¾@ 2
Yellow Chrome	.11 @14
Vermilion, American Lead	.10 @25
Vermilion, Quicksilver, bulk	@65
Vermilion, Quicksilver, bags	@68
Vermilion, English, Import	.75 @80
Vermilion, Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1905, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Domestic, ℔ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—
See *Caps, Cartridges, Shells, &c.*

Anvils—American—
Eagle Anvils.....℔ lb 6¾@7 ¢
Hay-Budden, Wrought.....9@9¼ ¢
Horseshoe brand, Wrought.....9@9¼ ¢
Trenton .....℔ lb 9@9¼ ¢

Imported—
Peter Wright & Sons.....℔ lb 10½ ¢

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....15&10%

Apple Parers—
See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co.....33⅓%

Augers and Bits—
Com. Double Spur.....75@75&5%
Jennings' Pats., reg. finish.... 50&10@60%
Black Lip or Blued.....60&10%
Boring Mach. Augers.....70&10%
Car Bits, 12-in. twist.....50&10%
Ford's Auger and Car Bits.....40&5%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50&10&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits.....40&10%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist....60&10%
Wright's Jennings' Bits.....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ℔ doz. $26; No. 2, $18.....65%
Ford's, Clark's Pattern.....60&5%
C. E. Jennings & Co., Steer's Pat..25%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.60; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—
Ship Augers.....45&5@60%
Ford's .....33⅓@5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....35&5%
Ohio Tool Co.'s.....40%
Snell's 40%

Awl Hafts—
See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00
Hurwood 40%

Awl and Tool Sets—
See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights:
First Quality.....$6.75
Second Quality.....$6.25
Double Bit, base weights:
First Quality.....$9.00
Second Quality.....$8.50

Axle Grease—
See *Grease, Axle*

Axles—
Iron or Steel
Concord, Loose Collar...4¼@4¾¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...3¼@3¾¢
No. 1½ Com., New Style3¾@4¼¢
No. 2 Solid Collar.....4@4½¢
Half Patent:
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18...75&10@75&10&5%
Nos. 19 to 22...75&10@75&10&5%

Boxes, Axle—
Common and Concord, not turned lb..4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb. 8½@9¢

Bait—
Fishing—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—
Sash—
Caldwell new list.....50%
Pullman .....50&10@60%

Spring—
Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%

Barb Wire—
See *Wire, Barb.*

Bars—
Crow—
Steel Crowbars, 10 to 40 lb.... per lb., 3@3¼¢

Towel -
No. 10 Ideal, Nickel Plate..℔ gro. $8.50

Beams, Scale—
Scale Beams.....40&10@50%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.85; Tinned $1.00
No. 11 Wire Coppered ℔ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized..℔ doz. $1.75
Western W. G. Co.:
No. 1 Electric.....℔ gro. $7.80
No. 2 Buffalo.....℔ gro. $9.00
No. 3 Perfection Dust.....℔ gro. $8.00

Egg—
Holt-Lyon Co.:
Holt, No. A, Japanned....℔ doz. $1.20
Holt, No. 1, Tinned.....℔ doz. $1.50
Holt, No. B, Japanned....℔ doz. $2.00
Holt, No. 2, Tinned.....℔ doz. $2.25
Lyon, No. 2, Japanned....℔ doz. $1.25
Lyon, No. 3, Japanned....℔ doz. $1.50
Taplin Mfg. Co.:
No. 60 Improved Dover.....℔ gro. $6.00
No. 75 Improved Dover.....$6.50
No. 100 Improved Dover.....$7.00
No. 102 Improved Dover, Tin'd..$8.50
No. 150 Improved Dover, Hotel..$15.00
No. 152 Imp'd Dover, Hotel, T'd.$17.00
No. 200 Imp'd Dover Tumbler....$8.50
No. 202 Imp'd Dover Tumbler, T'd.$9.50
No. 300 Imp'd Dover Mammoth, ℔ doz. $25.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (S. S. & Co.).℔ gro. net, $6.00

Bellows—
Blacksmith, Standard List.. 60&10@70&10%

Hand—
Molders—
Net Prices.

Inch..	6	7	8	9	10
Doz...	$4.75	5.70	6.65	7.60	8.85

Inch..	9	10	11	12	14
Doz...	$8.00	9.00	10.50	12.50	14.50

Bells—
Cow—
Ordinary goods...75&5@75&10&5%
High grade.....70&10@70&10&5%
Jersey .....75&10%
Texas Star.....50%

Door—
Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....60&10&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

Hand—
Hand Bells, Polished, Brass.. 60&10@60&10&5%
White Metal.....60%
Nickel Plated.....50&10&60%
Swiss .....60@60&7½%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....33⅓@35%

Miscellaneous—
Farm Bells.....lb. 2½¢
Steel Alloy Church and School 50&10@60%
American Tube & Stamping Co. Gongs 75%
Table Call Bells.....50@50&10%

Belting—
Leather—
Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard 70%
Light Standard.....70&5%
Cut Leather Lacing.....50&5%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—
Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender.....40%
Green River Tire Benders and Upsetters 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

Bicycle Goods—
John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—
Tackle—
Common Wooden....70&10@75%
Hartz St. Tackle Blocks.....50@50&5%
Hollow Steel Blocks, with Ford's Patent Sheaves.....50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron....50&10%
Stowell's Self Loading.....60%
See also Machines, Hoisting.

Boards, Stove—
Zinc, Crystal, &c...30&10@40&10%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co.....33⅓%

Bolts—
Carriage, Machine, &c.—
Common Carriage (cut thread):
⅝ x 6 and smaller.....75@—%
Larger and Longer..65&5@—%
Phila. Eagle $3.00 list May 24, '99 80%
Bolt Ends, list Feb. 14, '95.... 65&10@—%
Machine, ⅝ x ¼ and smaller 75@—%
Machine, larger and longer.. 65&10@—%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:

Inch.....	3	4	5	6	8
Per doz.	$0.30	.35	.45	.60	.80

Cast Iron Spring Foot, Jap'd:

Inch.....	6	8	10
Per doz.....	$1.20	1.50	2.25

Cast Iron Chain, Flat, Japanned:

Inch.....	6	8	10
Per doz.....	$1.00	1.40	1.65

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch.....	6	8	10
Per doz.....	$0.75	.95	1.25

Wrt Barrel Japd.....80@80&10%
Wrt " Bronzed....50@50&10%
Wrt. Spring...70&10@70&10&10%
Wrt. Shutter.....50&5@50&10&5%
Wrt. Square Neck.....75@75&10%
Wrt Square.66⅔&10@66⅔&10&10%
Ives' Patent Door.....60%

Plow and Stove—
Plow .....65&10&10@70%
Stove .....87½&10@—

Tire—
Norway Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—
Borers Tap, Ring, with Handle:

Inch.....	1¼	1½	1¾	2
Per doz...	$4.80	5.60	6.40	8.00
Inch	2¼		2½	
Per doz.....	$6.65		11.50	

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.....25%

Boxes, Mitre—
C. E. Jennings & Co.....30%
Langdon .....15&10%
Perfection 40%
Seavey 33⅓%
Stanley R. & L. Co.:
Nos. 240 to 460.....30%
Nos. 50 and 60.....35%

Braces—
Common Ball, American..$1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley 35%
Victor 45%

Brackets—
Wrought Steel...80&10@80&10&5%
Griffin's Pressed Steel.....80@80&10%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—
Price per dozen.

Quart.....	10	12	14
Water, Regular...	1.40	1.70	1.90
Water, Heavy....	3.40	3.70	3.80
Fire, Rd. Bottom..	2.30	2.55	2.95
Well	2.55	2.87	3.15

Bucks, Saw—
Hoosier.....℔ gro. $36.00

Bull Rings—
See *Rings, Bull*

Butts—
Brass—
Wrought, list, Sept., '96..15@—%
Cast Brass, Tiebout's.....50%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow....40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—
Table and Back Flaps...75%
Narrow and Broad.....75%
Inside Blind.....75%
Loose Pin.....75%
Loose Pin, Jap'd....70&10%
Loose Pin, Ball and Steeple Tip 85%
Japanned Ball Tip Butts... 70&10%
Bronzed, Wrt., Nar. and Inside Blind Butts....55&10%

Ex. 10&10&10@10&10&10&5%

Cages, Bird—
Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb.4@4½¢
Sharp, 1 prong...per lb., 4½@4¾¢
Burke's Blunt.....4@4¼¢
Burke's Sharp.....4½@4¾¢
Gautier, Blunt.....4@4¼¢
Gautier, Sharp.....4½@4¾¢
Perkins', Blunt Toe.....₱ lb 3.65¢
Perkins', Sharp Toe.....₱ lb 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.35 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$48.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M...20%
B. L. Caps (Sturtevant Shells) $2 per M.....20%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd.$1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
$8.60	5.80	4.85	4.10	3.95	3.55	3.80
⅝	¾	⅞ to 1		1⅛ to 1¼ inch.		
$3.75	3.60	3.55		3.70		

German Coil.....60&10&10@70%

Halter—

Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 2½, '97.....60&10&10%
Covert Mfg. Co, Halter.....35&5%
Covert's Saddlery Works Halter.....70%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring.$24.50
6½—6-2, Str'ght, with ring.$25.50
6½—8-2, Str'ght, with ring.$29.50
6½—10-2, Str'ght, with ring.$34.00
NOTE.—Add 2c per pair for Hooks. Twist Traces 2c per pair higher than Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....60&10%

Miscellaneous—

Jack Chain, list July 10, '98:
Iron.....60&10&5@70%
Brass.....60&10@60&10&10%
Safety Chain.....75@75&10%
Gal. Pump Chain.....lb. 4@4½%
Covert Mfg. Co.:
Breast.....35&5%
Heel.....35&5%
Rein.....35&5%
Stallion.....35&5%
Covert Sad. Works:
Breast.....70%
Hold Back.....70%
Rein.....70%
Oneida Community:
Am. Dog Leads and Kennel Chains, 40@40&5%
Niagara Dog Leads and Kennel Chains.....45@60&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Copper Chain.....60&5%
Steel Chain.....60%
Pullman:
Bronze Chain.....60%
Steel Chain.....60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)

Carpenters' Blue.....gro. 38@40¢
Carpenters' Red.....gro. 33@33¢
Carpenters' White....gro. 28@30¢
See also Crayons.

Checks, Door—

Bardsley's.....45%
Eclipse.....60&10%
Pullman, per gro.....$54.00
Russwin.....40%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters', etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List.....75@75&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60%
C. E. Jennings & Co. Socket Framing No. 15.....60%
Ohio Tool Co.'s.....70%
Swan's.....75%
L. & I. J. White.....30@30&5%
L. & I. J. White, Tanged.....25&5%

Tanged—

Tanged Firmers.....33 1-3@40%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181..25%

Cold—

lb.
Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary...9@10¢

Chucks—

Beach Pat., each $3.00.....35&5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....50%
Universal.....50%
Combination.....50%
Drill Chucks, New Model.....30%
Drill Chucks, Standard.....45%
Drill Chuck, Skinner Pat., all sizes.35%
Drill Chucks, Positive Drive.....30%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination.....50%
Czar Drill.....35%
Combination Geared Scroll.....40%
Geared Scroll.....40%
Independent.....50%
Independent Steel.....40%
Union Drill.....45%
Universal.....50%
Independent Iron F. Plate Jaws.40%
Independent Steel F. Plate Jaws.40%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P., S. & W. Co.....40&10@50%
Carriage Makers', Sargent's.....60%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Saw Clamps, see Vises, Saw Filers'.
Wood Workers, Hammers'.....40&10%

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..₱ doz. $4.05 net
Star Shank, All Steel..₱ doz. $3.24 net
W. & C. Shank, All Steel, ₱ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....33⅓@33⅓&10%
L. & I. J. White.....30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse.....$8.75 } 15%
1902 Chicago Horse.....10.75 }
20th Century Horse, each, $5.00...20%
Lightning Belt.....$15.00 } 15%
Chicago Belt.....$20.00 }
Stewart's Patent Sheep, $12.75....20%

Clips, Axle—

Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire
—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.....75@75&5%

Coffee Mills—
See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Mane and Tail—

Covert's Saddlery Works.....60&10%

Compasses, Dividers, &c.

Ordinary Goods.....75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%
Wm. Schollhorn Co.:
Excelsior Dividers.....60%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

Territory:	*Galvanized Galv. Steel.*	*Charcoal Iron.*	*Copper.*
Eastern:			
	70&12½%	*60&10 %*	*50%*
Central:			
	70&5 %	*60&10 2½%*	*40&10&5%*
Southern:			
	65&12½%	*50&15 %*	*40&12½%*
So. Western			
	60&15 %	*50&7 %*	*40&10 %*
	Copper.		*1½&16 oz.*
Eastern			*50&10%*
Central			*50&7½%*
Southern			*50&5%*
So. Western			*50&2½%*

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each..	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	6	8	
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15
White Enameled					25%
Agate Lined					25%

Coopers' Tools—
See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 23@24¢; lighter than 3 lbs. to pair.....25@26¢

Cord—Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 2½¢; No. 7, 2½½¢; No. 6, 2½½¢.
Cable Laid Italian..... lb., A, 18¢; B, 16¢
Common India.....lb. 10@10½¢
Cotton Sash Cord, Tw'ted..17@19¢
Patent Russia.....lb...@14¢
Cable Laid Russia....lb...@15¢
India Hemp, Braided..lb...@18¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted..lb. 12@13¢
Anniston Cordage Co.; ₱ doz., 50 ft., Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ₱ lb. 24½¢; No. 7, 23½¢; Nos. 8 to 12, 23¢
Eddystone Braided, Nos. 8, 9 and 10, 23¢; 7, 25½¢; 6, 26½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....₱ lb 23 ¢
Peerless:
Cable Laid Italian.....16 ¢
Cable Laid Russian.....14 ¢
Cable Laid India.....12 ¢
Braided India.....18 ¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, Drab Cotton.....₱ lb 40 ¢
Braided, Italian Hamp.....₱ lb 40 ¢
Braided, Linen.....₱ lb 55 ¢
Braided, White Cotton or Spot.....₱ lb 35 ¢
Massachusetts, White.....₱ lb 30 ¢
Massachusetts, Drab.....₱ lb 35 ¢
Phoenix, White, Nos. 8 to 12, 27¢; No. 7, 27½¢; No. 6, 28½¢.
Silver Lake:
A quality, Drab.....40 ¢
A quality, White.....35 ¢
B quality, Drab.....35 ¢
B quality, White.....30 ¢
Italian Hemp.....40 ¢
Linen.....57½ ¢
See also Chain and Ribbon.

Wire, Picture—

List Oct., '00.....85&10&10@85&10&10&5%
Hendryx Standard Wire Picture Cord, 85&10&5%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, gr. 6@6½¢
Cases, 100 gro., $5.00 at factory.
D. M. Steward Mfg. Co.: (Case lots, 20%)
Jumbo Crayons.....gr. $3.50
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square.....gr. $1.50
Rolling Mill Crayons.....gr. $2.50
Railroad Crayons (composition).....gr. $2.00
Zelnicker's Lumber:
Red, Blue, Green.....₱ gro. $6.50
Black.....₱ gro. $4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, Heavy.....₱ doz. $7.00
Fort Madison, Light.....₱ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....₱ doz. $3.00
Wm. Rogers & Son.....₱ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise.....25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's.....₱ doz. 40@50%

Nos.	1	2	3	
	$14.00	$17.00	$19.00	$30.00

Ideal.....40&10@50%
Little Giant.....₱ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$60.00

N. E. Food Choppers.....25%
New Triumph No. 605, ₱ doz. $24.00.....40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....₱ doz. 40@50%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 24 x 7, 26 x 8, 30 x 9.....55%
Kraut Cutters, 36 x 12, 40 x 12....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₱ doz. $3.00
Combined Slaw Cutter and Corn Grater.....₱ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..₱ gr. $18@$20
Slaw Cutters, 2 Knife..₱ gr. $22@$30

Tobacco—

All Iron, Cheap..doz. $1.25@$1.50
Enterprise.....25@30%
National, ₱ doz., No. 1, $21; No. 2, $18.....40%
Sargent's, ₱ doz., No. 2.....60%
Sargent's, Nos. 12 and 21.....60&10%

Washer—

Appleton's, ₱ doz., $16.00....50&10&10%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger..per doz., $9.00
Iwan's Imp'ved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers.....₱ doz. $6.25
Iwan's Perfection Post Hole Digger..₱ doz. $8.25
Iwan's Split Handle Post Hole Diggers.....₱ doz. $7.25
Kohler's Universal.....₱ doz. $14.00
Kohler's Little Giant.....₱ doz. $12.00
Kohler's Hercules.....₱ doz. $10.00
Kohler's Invincible.....₱ doz. $9.00
Kohler's Rival.....₱ doz. $8.00
Kohler's Pioneer.....₱ doz. $7.00
Never-Break Post Hole Diggers, ₱ doz., $24.00.....60%
Samson, ₱ doz. $34.00.....25%

Dividers—See *Compasses.*

Doors, Screen—

Phillips', style E, ⅞ in.....₱ doz. $10.00
Phillips', style 077, ⅞ in.....₱ doz. $7.50
Phillips', style x-y, ⅞ in.....₱ doz. $10.50

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₱ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill, each.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills..33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank..... 60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ₱ doz., 2½-in., $6; 4-in., $7.50; 6-in., $9.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....50&10%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 50, 53 and 55.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles.....65%
No. 86.....75%
Victor.....55%
Defiance.....70%
Swan's:
Nos. 7565 to 7568.....50%
No. 7540.....40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized Galv. Steel.*	*Charcoal Iron.*	*Copper.*
Eastern:			
	80&5 %	*70&10%*	*50%*
Central:			
	75&10&10%	*70& 2½%*	*40&10&5%*
Southern:			
	75&12½%	*60&20%*	*40&12½%*
So. Western:			
	75&5 %	*65&5%*	*40&10 %*

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I.
Gauge.....60&10%
No. 26.....50%
No. 24.....25%
No. 22.....10%
Copper.....50%

Elbows, Stove Pipe—

Dover, one piece.....40%
Perfect Elbows (S., S. & Co.).....40%

Emery, Turkish—

4 to 16 5½ to 220 Flour

Kegs	*lb. 5 ¢*	*5½¢*	*3¼¢*
½ Kegs	*lb. 5¼¢*	*5¾¢*	*3¾¢*

¼ Keys.....lb.5½¢ 6 ¢ 4 ¢
10-lb. cans, 10 in case....6½¢ 7 ¢ 6 ¢
10-lb. cans, less than 10.....10 ¢ 10 ¢ 8 ¢
Less quantity..10 ¢ 10 ¢ 8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's .....50&10%
Walling's .....40&10%

Cord and Weight—
Ives 40%

Faucets—
Cork Lined.....50@50&10%
Metallic Key, Leather Lined.. 60&10@70%
Red Cedar.....40&10@50%
Petroleum .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined..50%
John Sommer's Reliable Cork Lined.. 50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined....50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List revised Nov. 1, 1899.
Best Brands.....70&10@75&5%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....33 1-3@40%

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103.....$3.75
Special, No. 104.....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz	$3.25	3.75	4.25	4.75

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's 70%
Stowell's Giant Grindstone Hanger.. ℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy .....50&10&10%
Stowell's Grindstone Fixtures, Light. 60&10%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ery Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—
White, S'g't Bar, per doz..75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	$1.30	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
10&2½%

Gates, Molasses and Oil—
Stebbins' Pattern.....80&10%

Gauges—
Marking, Mortise, &c..50&10@60%
Chapin-Stephens Co.:
Marking, Mortise, &c.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....35%
Marking and Mortise.....60%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P. S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....60@60&10&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush.. 25&10@50%
International Glue Co. (Martin's)..40%

Grease, Axle—
Common Grade....gro. $4.50@6.00
Dixon's Everlasting..10-lb pails, ea. 85¢
Dixon's Everlasting, in boxes, ℔ doz. 1 lb, $1.20; 2 lb, $2.00
Helmet Hard Oil.....25%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—
Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ℔ doz.....$2.00 } 33⅓%
Pike Mower and Tool Grinder, each .....$6.00 }
Velox Ball Bearing, Mounted, Angle Iron Frames, each.....$3.00

Halters and Ties—
Cow Ties.....60&10@60&10&5%
Covert Mfg. Co.:
Web .....35&5%
Jute Rope.....50%
Sisal Rope.....30&10%
Cotton Rope.....45%
Hemp Rope.....45%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties 70%
Sisal Rope Ties.....60&10%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%
E. T. Rugg & Co.:
Leather Halters.....50%
Web Halters and Webbing.....60%
Jute and Sisal Rope Halters.....60%
Jute and Sisal Horse and Cattle Ties 60%
Cotton Horse Ties.....60%
Livery Ties, Braided.....60%

Hammers—
Handled Hammers—
Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....50%
Peck, Stow & Wilcox, Steel.....50%
Fayette R. Plumb:
Plumb, A. E. Nail.....33⅓&7⅓@33⅓&10&7⅓%
Engineers' and B. S. Hand.....50&7⅓&5@50&10&7⅓&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....40&2½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—
Under 3 lb., per lb..50¢..80&5@—%
3 to 5 lb., per lb., 40¢..80&5@—%
Over 5 lb., per lb., 30¢, 80&10&5@—%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....45@50%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50%
D Handles.....50@50&5%

Cross-Cut Saw Handles—
Atkins' 40%
Champion .....45@45&10%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted...gro. $2.50@3.00
Brad Awl.....gro. $1.65@$1.75
Chisel Handles:
Apple Tanged Firmer, gro. assorted .....$2.40@$2.65
Hickory Tanged Firmer, gro. assorted .....$2.15@$2.40
Apple Socket Firmer, gro. assorted .....$1.75@$1.95
Hickory Socket Firmer, gro. assorted .....$1.45@$1.60
Hickory Socket Framing, gro. assorted .....$1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel .....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle.... ℔ gro. $0.85@$1.50

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c
Allith Mfg. Co.:
Reliable, No. 1.....per doz. $8.00
Reliable, No. 2.....per doz. $9.60
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.00
Parlor, Standard.....$3.15
Parlor, No. 105.....$2.85
Parlor, New Model.....$2.80
Parlor, New Champion.....$2.25
Barn Door, Standard.....60&5%
Hinged.....net $6.40
Covered .....60&2%
Special .....70&5%
Lawrence Bros.:
Advance .....60&10%
Cleveland 75%
Clipper, No. 75.....60%
Crown .....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant .....60&5%
Hummer .....70&5%
New York.....60&10%
Peerless 75%
Sterling .....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60&5%
Richards Mfg. Co.:
Pioneer Wood Track No. 3..$2.00
Ball B'r'g St'l Track No. 10.50&10%
Roller B'r'g St'l Track No. 12.$2.15
Roller B'r'g St'l Track No. 13.$2.30
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&10%
Trolley B. D. No. 17.....$1.25
Trolley F. D. No. 120.....$2.10
Trolley F. D. No. 121.....$2.25
Trolley F. D. No. 150.....$2.35
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 41..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&10%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.00
Trolley B. D. No. 20.....50&10%
Trolley B. D. No. 24.....$1.30
Trolley B. D. No. 27.....$1.40
Trolley B. D. No. 28.....$1.60
Roller Bearings Nos. 39, 41, 43 .....75%
Anti-friction No. 42.....60&20%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Safety Door Hanger Co.:
Storm King Safety.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas 60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator 40%
Express 50%
Freight Car Door.....60%
Interstate .....60&10%
Lundy Parlor Door.....50&10%
Magic 60%
Matchless .....60&10%
Nansen .....70&5%
Parlor Door.....50&10%
Railroad .....50&10%
Rex Hinge Door.....60%
Street Car Door.....50%
Steel, Nos. 300, 400, 500.....50&10%
Underwriters' Fire Door.....40%
Wild West Warehouse Door.....50%
Zenith for Wood Track....50&10%
A. L. Sweet Iron Works:
Check Back.....70%
Climax Anti-Friction.....50&10%
Eagle 70%
Hylo Hinge.....60%
New Perfection.....60%
Pilot 60%
Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing..℔ doz. $5.00
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40%
Ives, Wood Track.....60&10%
L. T. Roller Bearing.....60&10&5%
New Era Roller Bearing..50&10%
O. K. Roller Bearing..60&10&5%
Prindle, Wood Track.....60%
Richards' Wood Track.....60%
Richards' Steel Track.....50&10%
Spencer Roller Bearing....60&10%
Tandem, Nos. 1 and 2.....60%
Underwriters' Roller Bearing..40%
Velvet 50%
Wilcox Auditorium Ball B'r'g.20%
Wilcox Barn Trolley No. 125..40%
Wilcox Elv. Door, Nos. 112 and 122½.....50%
Wilcox Elv. Door, No. 132....40%
Wilcox Fire Trolley, Roller Bearing.....30%
Wilcox Le Roy Noiseless Ball Bearing 40%
Wilcox New Century..50&10&10%
Wilcox O. K. Steel Track....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing..40%
Wilcox Wideman Narrow Gauge Ball Bearing.....40%

Extra 10% often given.

For Track, see Rail.

Hangers— Garment—
Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled.. $27.00
Victor Folding .....℔ gro. $9.60
Western, W. G. Co.....70&10%

Gate—
Myers' Patent Gate Hangers, ℔ doz. net $4.50

Joist and Timber—
Lane Bros. Co.....30%

Hasps—
Griffin's Security Hasp.....50%
McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—
Regular list, first quality....50%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....15%
Clark Coal, ℔ doz. $0.75.....10%

Hinges—
Blind and Shutter Hinges—
Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	$0.75	1.35	2.70

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	$0.70	.65	.60	.55

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	$0.70	.65	.60

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Sargent's, Nos. 1, 3, 11 and 13..75&10%
Stanley's Steel Gravity Blind Hinges, ℔ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5.... 75&10&5%
Tip Pat'n, Nos. 1, 3 & 5.....10&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 9½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	.35

New England:

With Latch....doz.		*@$2.00*
Without Latch...doz.		*@$1.60*

Reversible Self-Closing:

With Latch....doz.	*@$1.75*
Without Latch...doz.	*@$1.35*

Western:

With Latch.....doz.	*$1.75*
Without Latch.....doz.	*$1.15*

Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets.

Nos.	1	2	3
Hinges with Latches..	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges—
Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

Spring Hinges—
Holdback, Cast Iron...$6.50@$7.00
Non-Holdback, Cast Iron$6.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor Hinges 40%
Bommer Spring Hinges.....40%
No. 990 Wrot. Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor Hinge 50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, No. 14.....℔ gr. $9.00
Columbia, No. 18.....℔ gr. $25.00
Columbia, Adjustable, No. 7, ℔ gr. $12.00
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.00
Oxford, new list.....30%
Lawson Mfg. Co., Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....℔ gr. $9.00
Ball Bearing Floor Hinge....50%
Ohio Detachable Screen Door Hinge .....℔ gr. $12.00
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea, No. 1.....℔ gr. $9.00
New Idea, Double Acting....45%
New Idea, Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb'k.℔ gro. pr.$9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges...70%
H'vy Strap H'g's...75&5%
Light T Hinges.....65%
Heavy T Hinges.....60%
Extra H'y T H'g's.70&10%
Hinge Hasps.....50%
Cor. Heavy Strap..75&5%
Cor. Ex. Heavy T.70&10%
Extra 10@10&5%
Screw Hook and Strap. 6 to 12 in..lb. 3¾¢; 1¼ to 20 in..lb. 3½¢; 22 to 36 in..lb. 3¼¢
Screw Hook and Eye:
¾ to 1 inch.....lb. 6½¢
⅝-inch.....lb. 7½¢
½-inch.....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers....35%

Hods— Coal—

	Per doz.			
Inch	15	16	17	18
Galv. Open	$2.50	2.75	3.00	3.25
Jap. Open	$1.90	2.10	2.25	2.55
Galv. Funnel	$3.00	3.30	3.60	3.90
Jap. Funnel	$2.45	2.65	2.85	3.30

Masons' Etc.—
Avery-Caldwell Mfg. Co.:
Steel Brick.....each $1.00
Steel Mortar.....each $1.25
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $0.95
Steel Mortar, No. 158.....each $1.25

Hoes— Eye—
Scovil and Oval Pattern.....60&10@60&10&10%
Grub, list Feb. 23, 1899.....70&10@75&10%
D. & H. Scovil.....33⅓%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding No. 1, $2.00; No. 2, $2.25
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₰ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₰ doz. 66⅔%
Junior Size.....₰ doz. $4.00
Ft. Madison Sprouting Hoe..₰ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....75&10&1⅔%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&5%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....₰ doz., net, $4.35
W. & C. L'tning Shuffle Hoe,₰doz.$4.85

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—
Angular, ₰ doz. $24.00.....45&10%

Door—
Bardsley's.....45%
Empire.....50%
Pullman.....50%

File and Tool—
Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—
Triumph Fruit Jar Holder, ₰ gross, $10.80; ₰ doz.....$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—
Bird Cage, Reading.....40%
Bird Cage, Sargent's List.....60&10%
Ceiling, Sargent's List, Nos. 29, 32, 33, 129, 132, 133 and 135.....50&10&10%
Clothes Line, Reading List.....40%
Clothes Line, Sargent's List.50&20&10%
Coat and Hat, Sargent's List...50&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—
Belt.....80&10@..%
Wire C. & H. Hooks:.....75&10@75&10&10%
Columbian Hdw Co., Gem.....70&10%
Parker Wire Goods Co., King..70&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme.....60&10%
Chief.....70%
Crown.....75%
Czar.....65%
V Brace.....75%
Czar Harness.....60&10%

Wrought Iron—
Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.—See Wrought Goods.

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz. $1.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz.....$1.30
Whiffletree.....lb. 5¾@6¢
Hooks and Eyes:
Brass.....60&5@60&10&5%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....35%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ₰ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition.....ft. 5 @ 6 ¢
3-ply Guaranteed..ft. 8 @ 9 ¢
4-ply Guaranteed..ft. 10 @11 ¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8 @ 9 ¢
Fair Quality.....ft. 10 @11 ¢

Irons— Sad—
From 4 to 10.....lb. 3 @3½¢
B. B. Sad Irons.....lb. 3¼@3½¢
Mrs. Potts', cents per set:

Nos.	50	55	60	65
Jap'd Tops	68	65	78	75
Tin'd Tops	71	68	81	78

New England Pressing.lb. 3¾@4¢

Pinking—
Pinking Irons.....doz. 60¢

Irons, Soldering
See *Coppers.*

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&2%
Steel.....45%
Covert's Saddlery Works:
Daisy.....60&10%
Victor.....60%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—
Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....50%
Corn—
Withington Acme, ₰ doz. $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.
Drawing—
Standard List.....75@75&10%
C. E. Jennings & Co., Nos. 45, 46...60%
Jennings & Griffin, Nos. 41, 42.....60%
Ohio Tool Co.'s.....70%
Swan's.....75%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%
Hay and Straw—
Serrated Edge, per doz.$5.75@6.00
Iwan's Sickle Edge.....₰ doz. $9.50
Iwan's Serrated.....₰ doz. $10.00
Mincing—
Buffalo.....₰ gro. $13.00
Miscellaneous—
Farriers'.....doz. $3.00@3.25
Wostenholm's.....₰ doz. $3.00@3.25
Knobs—
Base, 2½-inch, Birch, or Maple, Rubber Tip.....gro.$1.25@$1.50
Carriage, Jap., all sizes.....gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%
Picture, Sargent's.....60&10&10%

Lacing, Leather—
See *Belting, Leather—*
Ladders, Store, &c.—
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 100.....50%
Ladles, Melting—
L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....50&10%
Lanterns—Tubular—
Regular Tubular, No. 0.....doz.$1.25@1.50
Lift Tubular, No. 0.....doz.$4.75@5.00
Hinge Tubular, No. 0.....doz.$4.75@5.00
Other Styles.....40@40&5%
Bull's Eye Police—
No. 1, 2¾-inch.....$2.75@3.00
No. 2, 3-inch.....$3.00@3.25
Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%
Latches— Thumb—
Roggin's Latches, with screw..doz. 35@40¢
Door—
Cronk & Carrier Mfg. Co., No. 101, ₰ doz. $2.90
Cronk & Carrier Mfg. Co., Latch Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50
Leaders, Cattle—
Small.....doz. 50¢; large, 60¢
Covert Mfg. Co., Cotton and Hemp.45%
Lifters, Transom—
B. & E.....33⅓%
Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	$2.25	2.00	1.75
75 feet	$1.75	1.35	1.10

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₰ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Anniston Waterproof Clothes, 50 ft., ₰ gro., $25.00; Gilt Edge, $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Locks— Cabinet—
Cabinet Locks...33⅓@33⅓&7½%
Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%
Elevator—
Stowell's.....90%
Padlocks—
Wrought Iron....75&10&5@80&5%
Net prices are general.
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%
Sash, &c.—
Ives' Patent:
Bronze and Brass.....62½%
Crescent.....50&10%
Iron.....62½%
Window Ventilating.....60%
Robison Patent Ventilating Sash Lock.....40%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Pullman Patent Ventilating Lock..25%
Reading.....40%

Machines—Boring—
Com. Upr't, without Augers.$2.00
Com. Ang'l'r, without Augers.$2.25
Swan's Improved.....40&10%
Angular.
Jennings', Nos. 1 and 4.....35&5%
Millers' Falls..... 5.75
Snell's, Rice's Pat. 2.50 2.75
Corking—
Reisinger Invincible Hand Power....₰ doz. $48.00
Fence—
Williams' Fence Machines....each, $5.50
Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%
Ice Cutting—
Chandler's.....12½%
Washing—
Boss Washing Machine Co.: Per doz.
Boss No. 1.....$57.00
Boss Rotary.....$54.00
Champion Rotary Banner No. 1..$54.00
Standard Champion No. 1.....$48.00
Standard Perfection.....$26.00
Cintl Square Western.....$30.00
Uneeda American, Round.....$30.00
Mallets—
Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Applewood.....doz. 45&5@50%
Mangers, Stable—
Swett Iron Works.....50%
Mashers, Vegetable—
Western, W. G. Co., Potato....60&10%
Mats, Door—
Elastic Steel (W. G. Co.,, new list..50&10%
Mattocks—
See *Picks and Mattocks.*
Milk Cans—See *Cans, Milk.*
Mills, Coffee, &c.—
Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria..50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%
Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest.....all sizes, $1.85@2.00
Cheap.....all sizes, $2.00@2.50
Better Grade..all sizes, $2.50@4.50

	12	14	16	18-in.
High Grade	$4.50	4.75	5.00	5.25

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing....60%
Pennsylvania, Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel....70&10&10&5%
Style B, Low Wheel.....70&10&5%
Style C, High Wheel.....70&10%
Style D, High Wheel.....70%
Philadelphia:
Styles M., S., C., K., T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—
Wire Nails and Brads, Papered, List July 20, 1899..85&5@85&10%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*
Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain	28	26	25	24	23	...50%
Coleman	13	12	12	11	11	...net
New Haven	23	21	20	19	18	...40&5%
Putnam	23	21	20	19	18	...33⅓%
New Putnam	19	18	17	16	16	..10&10%
Western						₰ lb 8½¢

Jobbers' Special Brands.....per lb.9@10¢
Picture—

	1½	2	2½	3	3½ in.
Brass H'd.	$.45	.55	.60	.70	.. gro
Por. Head.	1.10	1.10	1.10		.. gro

Nippers—
See *Pliers and Nippers.*
Nuts—
Cold Punched: Mfrs. or U. S. Standard. Off list.
Square, Blank or Tapped..$5.00
Hexagon, Blank or Tapped.$5.45
Square, Blank, C. T.....$5.30
Hexagon, Blank, C. T....$6.05
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square, Blank.....$5.30
Hexagon, Blank.....$5.20
Square, Tapped.....$5.20
Hexagon, Tapped.....$5.70

Oakum—
Best.....lb.6¼@6½¢
U. S. Navy.....lb.5¾@6¢
Navy.....lb.4½@5¢
Plumbers' Spun Oakum...2½@3¢
In carload lots ⅛¢ lb. off, f.o.b. New York.
Oil Tanks—See *Tanks, Oil.*
Oilers—
Brass and Copper.....50&10%
Tin or Steel.....65&10@70%
Zinc.....65&10@70%
Chase or Paragon:
Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Imp'ed, Nos. 11, 12 and 13.....20%
Malleable, Hammers' Old Pattern, Nos. 1, 2 and 3.....50%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%
Openers— Can—

	Per doz.
Sprague, Iron Handle	*.30@35¢*
Sprague, Wood Handle	*..35@40¢*
Sardine Scissors	*.$1.75@$3.00*
National	.50&10%
Stowell's Sprague	₰ doz. 35@45¢
Vim Tin Shear and Can Opener, ₰ doz., 75c.; per gro., $7.50	

Egg—
Nickel Plate.....₰ doz., $2.00
Silver Plate.....₰ doz., $4.00

Packing—
Asbestos Packing, Wick and Rope.....lb. 14@16¢
Rubber—
(*Fair quality goods.*)
Sheet, C. I.....8@10¢
Sheet, C. O. S.....9@13¢
Sheet, C. B. S.....10@14¢
Sheet, Pure Gum.....50@65¢
Sheet, Red.....40@50¢
Jenkins' '96, ₰ lb 80¢.....25@25&5%
Miscellaneous—
American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute.....lb. 4@ 4½¢
Russia Packing.....lb. 8@11 ¢
Pails, Creamery—
S. S. & Co., with gauges—No. 1, $6.25; No. 2, $6.50 ₰ doz.
Pails, Water, Well, &c.—
See *Buckets.*
Pans— Dripping—
Standard List.60&10@60&10&12½%
Fry—
Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	$0.75	0.80	0.90	1.10	1.30

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz	$1.95	2.25	2.80	3.15

Roasting and Baking—
Regal, S., S. & Co., ₰ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ₰ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₰ gro.:

No. 40	50	60	140	150	160
$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

Asbestos:	lb.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.	6¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lbs., per 100 sq. ft.	8¢
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.	10¢

Rosin Sized Sheathing: 500 sq. ft. Per roll
Light weight, 25 lbs. to roll.....35@40¢
Medium weight, 30 lbs. to roll, 40@45¢
Heavy weight, 40 lbs. to roll....50@60¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....$45.00@50.00
Red Rope Roofing, 250 sq. ft. per roll.....$1.75
Tarred Paper—
1 ply (roll 300 sq. ft.). ton....$32.50@35.50
2 ply, roll 108 sq. ft.....55@60¢
3 ply, roll 108 sq. ft.....75@85¢

Slater's Felt (roll 500 sq. ft.) .75¢
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.) $2.75

Sand and Emery—

Flint Paper and Cloth ..... 60@60&10%
Garnet Paper and Cloth 25%
Emery Paper and Cl'h ..... 60@60&10%

Parers—Apple—

Advance ..... ℔ doz. $4.00
Baldwin ..... ℔ doz. $4.00
Bonanza Improved ..... each $6.50
Daisy ..... ℔ doz. $4.00
Dandy ..... each $7.50
Eureka Improved ..... each $20.00
Family Bay State ..... ℔ doz. $15.00
Improved Bay State ..... ℔ doz. $36.00
Little Star ..... ℔ doz. $5.00
New Lightning ..... ℔ doz. $7.00
Reading 72 ..... ℔ doz. $3.25
Reading 78 ..... ℔ doz. $6.25
Rocking Table ..... ℔ doz. $6.20
Turn Table '98 ..... ℔ doz. $6.00
White Mountain ..... ℔ doz. $5.00

Potato—

Saratoga ..... ℔ doz. $7.00
White Mountain ..... ℔ doz. $6.00

Picks and Mattocks—

List Feb. 23, 1899 ..... 75%
Cronk's Handled Garden Mattock, ℔ doz., $6.40 ..... 33⅓%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass ..... 60@60&10%
Iron, list Nov. 11, '85 ..... 60@60&10%

Pipe, Cast Iron Soil—

Carload lots.
Standard, 2-6 in. 60%
Extra Heavy, 2-6 in. 70%
Fittings 75%

Pipe, Merchant—

	Consumers, Carloads.			
	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
⅛ & ¼ in.	71%	55%	68½%	52½%
⅜ & ½ in.	75%	63%	72½%	60½%
¾ to 6 in.	79%	69%	77 %	67 %
7 to 12 in.	74%	59%	72 %	56½%

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 2 to 24 in.:
New England 68%
New York and New Jersey 71%
Maryland, Delaware, E. Pa. 75%
West. Pa. and West Va 77%
Virginia 76%
Ohio, Michigan and Ky. 77%
Indiana 77%
NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—Wood Planes—

Bench, first qual ..... 40&10%
Bench, Second qual ..... 50&10%
Molding ..... 33⅓&10%
Bailey's (Stanley R. & L. Co.) 40%
Chapin-Stephens Co.:
Bench, First Quality ..... 40@40&10%
Bench, Second Quality ..... 50@50&10%
Molding ..... 33⅓@33⅓&10%
Toy and German ..... 40@40&10%
Chaplin's 60%
Ohio Tool Co.:
Bench, First Quality ..... 40@40&10%
Bench, Second Quality ..... 50@50&10%
Molding ..... 33⅓@33⅓&10%
Adjustable Wood Bottom 60%
Union 60%

Iron Planes—

Bailey's (Stanley R. & L. Co.) 40%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) 35%
Ohio Tool Co.'s Iron Planes 60%
Sargent's ..... 60&10%
Union 60%

Plane Irons—

Wood Bench Plane Irons ..... 25&10@30%
Buck Bros. 30%
Chapin-Stephens Co. ..... 30@30&10%
Ohio Tool Co. 30%
Stanley R. & L. Co. 35%
Union 50%
L. & I. J. White ..... 20&@25%

Planters, Corn, Hand—

Kohler's Eclipse ..... ℔ doz. $8.50

Plates—

Fellos ..... lb. 3¾@4¼¢
Self-Sealing Pie Plates (S., S. & Co.). ℔ doz. $2.00 ..... 50%

Pliers and Nippers—

Button Pliers ..... 75&10@75, 10, 5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.

Gas Pipe..	7	8	10	12-in.
	$2.00	$2.25	$3.00	$3.75

Acme Nippers ..... 50&5%
Cronk & Carrier Mfg. Co.:
American Button ..... 75&10%
Cronk's 60%
Stub's Pattern 50%
Combination and others 33⅓%
Heller's Farriers' Nippers, Pincers and Tools ..... 40&10@40&10&10%
The Nettleton Mfg. Co. Reversible Cutting Nippers 50%
P., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard 33⅓%
Elm City 33⅓%
Lodi 50%
Paragon 50%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10&10%
Chapin's Imp. Brass Cor. ..... 40@40&10&10%
Pocket Levels ..... 30@30&10&10%
Disston's Plumbs and Levels 70%
Disston's Pocket Levels 40%
C. E. Jennings & Co.'s Iron 33⅓%
C. E. Jennings & Co.'s Iron, Adjustable ..... 40&7½%
Stanley R. & L. Co. 45%
Stanley's Duplex 35%
Woods' Extension 33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00 ..... 50%

Points, Glaziers'—

Bulk and 1-lb. papers, lb. 8½@9 ¢
½-lb. papers ..... *lb.* 9 @9½¢
¼-lb. papers ..... *lb.* 9¾@10¼¢

Pokes, Animal—

Ft. Madison Hawkeye ..... ℔ doz. $3.25
Ft. Madison Western ..... ℔ doz. $4.00

Police Goods—

Manufacturers' Lists ..... 25@25&5%
Tower's 25%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72 ..... 40%
Prestoline Paste 40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz. $2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can ..... each, $0.65
Ladd's Black Beauty Liquid, per 100 tins $6.75
Joseph Dixon's, ℔ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ℔ lb 8¢
Fireside ..... ℔ gr. $2.50
Gem, ℔ gr. $4.50 ..... 10%
Japanese ..... ℔ gr. $3.50
Jet Black ..... ℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail ..... each 70¢
Black Silk, ½ lb box ..... ℔ doz. $1.00
Black Silk, 5 oz. box ..... ℔ doz. $0.75
Black Silk, ½ pt. liq ..... ℔ doz. $1.00

Poppers, Corn—

1 qt., Square ..... *gro.* $9.00
1 qt., Round ..... *gro.* $10.00
1½ qt., Square ..... *gro.* $11.00
2 qt., Square ..... *gro.* $13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts ..... each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled 40%
Tinned 35%

Powder—

In Canisters:
Duck, 1 lb ..... *each* 45¢
Fine Sporting, 1 lb ..... *each* 75¢
Rifle, ½-lb ..... *each* 15¢
Rifle, 1-lb ..... *each* 25¢
In Kegs:
12½-lb. kegs $3.50
25-lb. kegs $4.50
King's Semi-Smokeless:
Keg (25 lb bulk) $6.50
Half Keg (12½ lb bulk) $3.50
Quarter Keg (6¼ lb bulk) $1.90
Case 24 (1 lb cans bulk) $8.50
Half case (1 lb cans bulk) $4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun ..... 50&20%

Presses—Fruit and Jelly—

Enterprise Mfg. Co. ..... 20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00 ..... 50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Cork—

Invincible Cork Puller $21.00

Pullers, Nail—

Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00 ..... 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 ..... 50%
Pearson No. 1, Cyclone Spike Puller, each $30.00 ..... 50%
Pelican, ℔ doz. $9.00 ..... 40&10%
Scranton, Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00
Smith & Hemenway Co.:
Diamond B, No. 2, case lots ..... ℔ doz. $6.00
Diamond B, No. 3, case lots ..... ℔ doz. $5.50
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15 ..... 33⅓%
Staple Pullers 60%
Parrot Tack and Stub Puller, ℔ doz., 75c.; ℔ gro., $6.00

Pulleys, Single Wheel—

Inch	*1¼*	*1½*	*2*	*3*
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., ¼ in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	*1¼*	*1½*	*1¾*	*2*
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction ..... 60&10%
Dumb Waiter, Anti-Friction ..... 60&10%
Electric Light 60%
Side, Anti-Friction ..... 60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in. ..... 16@19¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in. ..... 16@19¢
Acme ..... 1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless 50%
Ideal ..... 70&10%
Niagara ..... 1¾ in., 16¢; 2 in., 19¢
No. 26, Troy ..... 1¾ in., 14½¢; 2 in., 16½¢
Star ..... 1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern ..... 60@60&10%
Pitcher Spout ..... 80@80&10%
Wood Pumps, Tubing, &c. ..... 45@50%
Barnes Dbl. Acting (low list) 50%
Barnes' Pitcher Spout ..... 75&10&5%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co. $16.00
Daisy Spray Pump ..... ℔ doz. $6.75
Flint & Walling's, Fast Mail Hand, (low list) 55%
Flint & Walling's Fast Mail (low list) ..... 55&5%
Flint & Walling's Tight Top Pitcher 80%
National Specialty Mfg. Co., Measuring, $6.00 ..... 30%
Mechanical Sprayer $6.00
Myers' Pumps (low list) 50%
Myers' Power Pumps 50%
Myers' Spray Pumps ..... 50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	*2*	*2¼*	*2½*	*2¾*
	$2.20	2.50	2.75	3.00
Inch...	*3*	*3¼*	*3½*	*3¾*	*4*
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	*2½*	*3*	*3½*	*4*
	$2.75	3.85	5.00	6.00

Punches—

Saddlers' or Drive, good ..... *doz.* 50@75¢
Spring, single tube, good quality ..... $1.75@2.00
Revolving (4 tubes) ..... *doz.* $3.50@3.75
Bemis & Call Co.'s Cast St'l Drive 50%
Bemis & Call Co.'s Check 55%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00 ..... 50%
Hercules, 1 die, each $5.00 ..... 50%
Niagara Hollow Punches 40%
Niagara Solid Punches ..... 55&10%
Wm. Schollhorn Co.:
Bernard 33⅓%
Lodi 50%
Paragon 50%
Steel Screw, B. & K. Mfg. Co. 50%
Tinners' Hollow, P., S. & W. Co. 40%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44 ..... 60%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron ..... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢ 30%
Allith Mfg. Co.:
No. 1, Reliable Hgr. Track, ℔ ft. 5½¢
No. 2, Reliable Hgr. Track, ℔ ft. 7¢
Cronk's:
Double Braced Steel Rail ..... ℔ ft. 2¾¢
O. N. T. Rail ..... 2½¢
Griffin's:
XXX, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $4.10.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in. ..... ℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢ 50%
None Better ..... ℔ ft. 3¾¢
Standard ..... ℔ ft. 4¢
Myers' Stayon Track ..... 60&10%
Richards' Mfg. Co.:
Common 1 x 3-6 in., $2.25; 1¼ x 3-16, $2.50; 1¼ x 3-16, $2.75.
Special Hinged Hanger Rail ..... 60&10%
Lag Screw Rail, No. 65 ..... 50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
Safety Door Hanger Co.'s Storm King Safety 60%
Safety Door Hanger Co.'s U. S. Standard 60%
Stowell's:
Cast Rail ..... ℔ ft. 1¾¢
Steel Rail, Plain 25%
Wrought Bracket, 1 3-16 in. ..... ℔ ft. 3¢
Wrought Bracket, 1¼ x 3-16 ..... ℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢ 60%
P. L. B. Steel Rail ..... ℔ 100 ft. $3.00
No. 0, 1 x 3-16 ..... ℔ 100 ft. $2.75

Rakes—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Fort Madison Red Head Lawn $3.25
Fort Madison Blue Head Lawn $2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net $4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00 ..... 75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00 ..... 80%
Queen City Lawn, ℔ doz., 20 teeth, $3.45; 24, $3.60 ..... net.
Anticlog Lawn, ℔ doz. $1.00
Malleable Garden ..... 70&10%
Kohler's:
Lawn Queen, 20-tooth ..... ℔ doz. $3.45
Lawn Queen, 24-tooth ..... ℔ doz. $3.60
Paragon, 20-tooth ..... ℔ doz. $2.75
Paragon, 24-tooth ..... ℔ doz. $3.00
Steel Garden, 14-tooth ..... ℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00
Weldless Steel Garden ..... 75&5%

Rasps, Horse—

Disston's 75%
Heller Bros. ..... 70&5@70&10&5%
McCaffrey's American St'd ..... 60&10&5%
New Nicholson ..... 70&10@75%
See also Files.

Razors—

Boras—I C 60%
Fox Razors, No. 42 ..... ℔ doz. $20.00 } 40% Dis.
Fox Razors, No. 44 ..... ℔ doz. $20.00 } 40% Dis.
Fox Razors, No. 82, Platina ..... ℔ doz. $25.00 } 40% Dis.
Red Devil 50%
Silberstein:
Carbo Magnetic $18.00
Griffon, No. 65 ..... $15.00
Griffon, No. 00 ..... $12.00
All other Razors 40%

Safety Razors—

Silberstein 40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber Populo, Nickeled Populo 20%
Aluminum, German Silv., Bronze 25%
1240 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 26 PN 30%
2904 P 33⅓%
2904 PN 33⅓%
0924 N 33⅓%
02084 N 33⅓%
002904 PN 33⅓%
802 N 33⅓%
986 PN, 2904 N, 974 PN 25%
5009 PN, 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
304 P, 304 PN, 00304 P, 00304 PN 33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed ..... 70&10%

Revolvers—

Single Action ..... 95¢@$1.00
Double Action, except 44 cal. $1.85
Double Action, 44 caliber $2.00
Automatic $3.45
Hammerless $4.00

Riddles, Hardware Grade

16 in. ..... *per doz.* $2.25@$2.50
17 in. ..... *per doz.* $2.50@$2.75
18 in. ..... *per doz.* $2.75@$3.00

Rings and Ringers—Bull Rings—

	2	*2½*	*3 inch.*
Steel	$0.70	0.75	0.80 *doz.*
Copper	$1.00	1.15	1.40 *doz.*

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes ..... $4.00@4.50
Hill's Ringers, Gray Iron ..... *doz.* 50@55¢
Hill's Ringers, Malleable Iron ..... *doz.* 70@75¢
Blair's Rings ..... *per gro.* $4.75@5.25
Blair's Ringers ..... *per doz.* $0.60@ .65
Brown's Rings ..... *per gro.* $5.00@5.50
Brown's Ringers ..... *per doz.* $0.60@ .65

Rivets and Burrs—

Copper ..... 50&5%
Iron or Steel ..... 75@75&5%

Slotted, Clinch and Tubular—

Assorted in Boxes.
Slotted Clinch, per doz. boxes, pasteboard boxes, 23@25¢; Tin ..... 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; *100 count, 51@58¢.*

Rollers—

Acme, Stowell's Anti-Friction 50%
Barn Door, Sargent's list 60%
Cronk's Stay No. 65, $0.90; No. 50 ..... $1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56 ..... $0.84
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. 53 ..... 75¢
O. K. Adj. and Reversible No. 58 ..... 50¢
Lag Screw, Nos. 55 and 57 ..... 50%
Underwriters', Nos. 59, 60 ..... 50%
Favorite, No. 54 ..... 60%
Stowell's Barn Door Stay ..... ℔ doz. $1.00
Swett's Anti-Friction 50%
Screw and Spike Stay ..... ℔ doz. 65¢
Hinge Adjustable Stay ..... ℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger: Pure ..... *lb.*, 12½¢
Sisal, 7-16 in. diam. and larger: Pure ..... *lb.*, 10¢
Sisal, 7-16 in. diam. and larger: No. 2 quality ..... *lb.*, 8¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed ..... *lb.*, 8¢
Pure ..... *lb.* 10¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed ..... *lb.* 8¢
Pure ..... *lb.* 10¢
Best, ¼-in. and larger ..... 16½@18¢
Medium, ¼-in. and larger, 15½@16½¢
Common, ¼-in. and larger ..... 10¢
In coils, ½¢ advance.
Jute Rope: Thread No. 1, ¼-in. & up. lb. 6½¢
Thread No. 2, ¼-in. & up, lb. 5½¢
Old Colony Manila Transmission Rope ..... ℔ lb 17½¢

Wire Rope—

Galvanized ..... 37½&2½%
Plain ..... 45&2½%

Ropes, Hammocks—
Covert Mfg. Co.:
Jute 80%
Sisal ..... 30&10%
Covert Saddlery Works ..... 60&5%

Rulers, Desk—
Stimpson & Son:
Boxwood and Maple ..... 30&10%

Rules—
Boxwood ..... 60&10&10%
Ivory ..... 35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood ..... 60@60&10%
Flexifold ..... 27½&10&10&2½%
Ivory ..... 35@35&10&10%
Miscellaneous ..... 60@50&10&10%
Combination ..... 55@55&10%
Stationers' ..... 10@10&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber 60%
Stanley R. & L. Co.:
Boxwood 62½%
Ivory 45%
Miscellaneous 60%
Zig Zag 40%
Zig Zag, Pin Joint 42½%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 50%
Band ..... 50&10@60%
Cross Cuts ..... 35&5%
Mulay, Mill and Drag 50%
One-Man Saw 40%
Wood Saws 40%
Hand, Compass, &c. 40%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 14 in. wide 60%
Band, ¼ to 1¾ 60%
Crosscuts 50%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 50%
Woodsaw Blades 35%
Woodsaw Rods 25%
Hand Saws, Nos. 12, 90, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 35%
Butcher Saws and Blades 35%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws ..... 35&5%
Framed Wood Saws 30%
Hand Saws ..... 20&2½%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 50%
Crescent Ground Cross Cut Saws 35%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 50%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. ..... 25@25&7½%
Wood Saws ..... 35@35&7½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws ..... 40&10@50%
Butcher Saws Blades ..... 35@40%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saws—
Atkins' Hack Saw Blades A A A 25%
Disston's:
Concave Blades 25%
Keystone 40%
Hack Saw Frames 30%
Fitchburg File Works, The Best 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180, ... 40&7½%
Hack Saws, Nos. 175, 180, complete ..... 40&7½%
Goodell's Hack Saw Blades 40%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades 35%
Diamond Hack Saw Frames 50%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 30&10&5%
Sterling Hack Saw Frames ..... 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 ..... 10%
Victor Hack Saw Blades 25%
Victor Hack Saw Frames 40%

Scroll—
Barnes' No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 25%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $4.00 ..... 15&10%

Scalers, Fish—
Covert's Saddlery Works ..... 60&10%

Scales—
Family, Turnbull's ..... 50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. ..... doz. $3.50
Two Platforms, ½ oz. to 8 lbs. ..... doz. $16.00
Union Platform, Plain. $1.70@1.90
Union Platform, Stpd. $1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
Chicago Scale Co.:
The "Little Detective" ..... 25 lbs 50%
Union or Family No. 2 ..... 60%
Portable Platform (reduced list) 50%
Wagon or Stock (reduced list) ..... 25@35%
"The Standard" Portables 50%
"The Standard" R. R. and Wagon 50%

Scrapers—
Box, 1 Handle ..... doz. $2.00@2.25
Box, 2 Handle ..... doz. $2.60@2.85
Ship .... Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00 ..... 45%
Chapin-Stephens Co., Box ..... 30@30&10&10%

Screens, Window and Frames—
Air Line Pattern Screens ..... 60&10%
Flyer Pattern Screens ..... 60&10@60&10&5%
Maine Screen Frames ..... 40&10&5%
Perfection Screens ..... 60&10@60&10&5%
Phillips' Screen Frames ..... 60&5@60&10%
See also *Doors.*

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@ 2.75; 1¼, $3.00@3.25; 1¼ .$3.50@3.75
Bench, W'd, Beech. doz. 30@30&5%
Hand, Wood ..... 30@30&5%
R. Bliss Mfg. Co., Hand ..... 30@30&10%
Chapin-Stephens Co., Hand ..... 30@30&10%
Ohio Tool Co., Bench and Hand 30%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99 ..... 75&15%
Coach, Gimlet Point, list Oct. 1, '99 ..... 75&10%
Hand Rail, list Jan. 1, '81 .... 70&10@75%

Jack Screws—
Standard List ..... 80@80&5%
Millers Falls ..... 50&10&10%
Millers Falls, Roller ..... 50&10%
P., S. & W. 50%
Sargent ..... 70&10%
Swett Iron Works ..... 75&10@80&5%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron .... 50@50&10%
Flat or Round Head, Brass .... 50@50&10%

Set and Cap—
Set (Iron) 80%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap 75%
Hex. Hd. Cap 75%
Rd. Hd. Cap ..... 60&10%
Fillister Hd. Cap ..... 60&10&10%

Wood—
List July 23, 1903.
Flat Head, Iron .... 87½&10@.. %
Round Head, Iron .... 85 &10@.. %
Flat Head, Brass .... 85 &10@.. %
Round Head, Brass .. 80 &10@.. %
Flat Head, Bronze .. 77½&10@.. %
Round Head, Bronze. 75 &10@.. %
Drive Screws ..... 87½&10%

Scroll Saws—
See *Saws, Scroll.*

Scythes—
Per doz.
Grass, No. 1, Plain Finish ... $6.25
Clipper, Bronzed Webb $6.50
No. 3 Clipper, Pol'd Webb .. $6.75
No. 6 Clipper & Solid Steel . $7.00
Bush, Weed & Bramble, No. 2. $6.50
Grain, No. 1 ..... $8.25
Bronzed Webb, No. 1 ..... $8.50
Nos. 3 & 4 Clipper, Grain .. $8.75
Solid Steel No. 6 ..... $9.25

Seeders, Raisin—
Enterprise ..... 25@30%

Sets—Awl and Tool—
Aiken's Sets, Awl and Tools: No. 20, ℔ doz., $10.00 ..... 60&10%
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 .... 15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00

Sets, Nail—
Octagon ..... gro. $3.50@3.75
Buck Bros. 27½%
Cannon's Diamond Point, ℔ gro. $12.40%
Mayhew's ..... ℔ gro. $9.00
Snell's Corgated, Cup Pt. ... ℔ gro. $7.20
Snell's Knurled, Cup Pt. .... ℔ gro. $7.20
Springfield Mach. Screw Co.: Diamond Knurled Cup Pt. ℔ gro. $7.50

Rivet—
Regular list ..... 75@75&10%

Saw—
Aiken's:
Genuine ..... 50&10%
Imitation ..... 50&10%
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut 30%
Plate 20%
Disston's Star and Monarch 25%
Morrill's No. 1, $15.00 ..... 50%
Nos. 3 and 4, Cross Cut, $20.00 ..... 50%
No. 5 Mill, $30.00 ..... 50%
Nos. 10, 11, 95, $15.60 ..... 50%
No. 1 Old Style, $10.00 ..... 50%
Special, $16.25 ..... 50%
Giant Royal Cross Cut ..... ℔ doz. $8.00
Royal, Hand ..... ℔ doz. $4.50
Taintor Positive ..... ℔ doz. $6.75

Shaving—
Fox Shaving Sets, No. 20 .....
℔ doz., net, $24.00
Smith & Hemenway Co.'s 60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co. 70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50

Skate—
Smith & Hemenway Co. 20%

Shaves, Spoke—
Iron ..... doz. $1.10@1.25
Wood ..... doz. $1.75@2.25
Bailey's (Stanley R. & L. Co.) 45%
Razor Edge (Stanley R. & L. Co.) .. 35%
Chapin-Stephens Co. ..... 30@30&10&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%
Wood's F1 and F2 ..... 50%

Shears—
	7	8	9 in.
Cast Iron..			
Best	*$16.00*	*18.00*	*20.00 gro.*
Good ...	*$13.00*	*15.00*	*17.00 gro.*
*Cheap .. *	*$5.00*	*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality Jap .... 70@70&10%
Best quality, Nickel .. 60@60&10%
Fair quality, Jap .... 80@80&5%
Fair quality, Nickel .. 75@7½&10%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson's Sheep, 1900 list ..... 50&10%

Tinners' Snips—
Steel Blades ..... 20&5@20&10%
Steel Laid Blades ..... 40&10@50%
Forged Handles, Steel Blades, Berlin ..... 60@50&5%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in. 50%
Niagara Snips 40%
P., S. & W. Forged Handles 20%

Pruning Shears—
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.: Pruning Shears, all grades ..... 50&10%
P. S. & W. Co. 33⅓%
Wilkinson's Hedge, 1900 list ..... 50&10%
Wilkinson's Lawn and Border 50%

Sheaves—Sliding Door—
Stowell's Anti-Friction 50%
Patent Roller, Hatfield's, Sargent's list ..... 70&10%
Reading 40%
R. & E. list 33⅓%
Wrightsville Hatfield Pattern 80%

Sliding Shutter—
Reading list 40%
R. & E. list 33⅓%
Sargent's list ..... 10&10%

Shells—Shells, Empty—
Brass Shells, Empty: Climax, Club, Rival, 10 and 12 gauge ..... 65&10%
Paper Shells, Empty: Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge. 25&10%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge ..... 20&5%
Climax, Union, League, New Rival, 10 and 12 gauge ..... 25&5%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ..... 20&5%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge ..... 33⅓&5%
Robin Hood, Low Brass ..... 20&10%
Robin Hood, High Brass ..... 30&10%

Shells, Loaded—
Loaded with Black Powder .. 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Robin Hood Smokeless Powder: Robin Hood, Low Brass 50%
Comets, High Brass ..... 50&10&5%

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron ..... per keg $4.00
Steel ..... per keg $3.75
Burden's, all sizes ..... ℔ keg $3.90

Shot—
Drop, up to B, 25-lb. bag $1.70
Drop, B and larger ..... per 25-lb. bag, $1.95
Buck, 25-lb. bag $1.95
Chilled, 25-lb. bag $1.95

Shovels and Spades—
Association List, Nov. 15, 1902. 40%

Snow Shovels—
Long Handle ..... $2.75@$3.00
Wood and Mall, D. Handle. $3.25@$3.50

Sieves and Sifters—
Hunter's Imitation ..... gro. $9.50@10.00
Hunter's Genuine ..... per gro. $12.00@12.50
Buffalo Metallic Blued, S. S. Co., ℔ gr.:

14&16	16&18	18&20
$13.20	$13.50	$14.40

Shaker (Barler's Pat.) Flour Sifters, ℔ doz., $2.00 ..... 20%

Sieves, Seamless Metallic
Per dozen.

*Mesh ..... *	*14*	*16*	*18*	*20*
Iron Wire.	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire.	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .... doz. $0.90@0.95
Mesh 20, Nested .... doz. $1.00@1.05
Mesh 24, Nested .... doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in .... 60&5%
20 x 30 to 24 x 50 in 55%
24 x 60 to 24 x 120 in 35%
Barnes' low list ..... 60&5%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron ..... 80@80&10%
Steel ..... 40@40&10%

Slates, School—
Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless .. 60&5 tens
Victor A, Noiseless ..... 60&5 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German ..... 40@40&10%
Covert Mfg. Co.:
Derby ..... 30&2%
High Grade 45
Jockey 35%
Trojan 45
Yankee ..... 30&2%
Yankee Roller ..... 30&2%
Covert's Saddlery Works:
Crown 60%
German 60%
Model 60%
Triumph 60%
Oneida Community:
Harness Snaps, 1 inch ..... 60&5%
Swivel Snaps 60%
Swivels 50%
Sargent's Patent Guarded .... 66⅔&10%

Snaths—
Scythe 50%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous—
German Silver ..... 60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver 50%

Tinned Iron—
Teas ..... per gro. 45@50¢
Tables ..... per gro. $0.50@$1.00

Springs—Door—
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 25%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 39 in. ..... ℔ doz. $1.10
Victor (Coil) ..... 50&10&10%

Carriage, Wagon, &c.—
1¼ in. and Wider: Per lb.
Black ..... 4@4¼¢
Half Bright ..... 4@4¼¢
Bright ..... 4½@4¾¢
Painted Seat Springs:
1½ x 2 x 26 ..... per pr. 42¢
1½ x 3 x 28 ..... per pr. 70¢

Sprinklers, Lawn—
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24 ..... 30%
Pleuger & Henger Mfg. Co.:
Cactus 70%
Japanese 75%
Nationals 65%

Squares—
Nickel plated .. } List Jan. 5, 1900.
Steel and Iron . } 75&5@75&10%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Sq. and T-Bevels 70%
Winterbottom's Try and Miter, No. 1, 40%; No. 2 ..... 50%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade ..... doz. $1.25
Tinned Iron ..... doz. $0.75@1.25
Iron, Porcelain Lined ... doz. $1.75

Staples—
Barbed Blind ..... lb. 6@6¼¢
Electricians', Association list .. 80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized $2.55
Poultry Netting Staples ..... per lb. 3¼@3½¢
Grand Crossing Tack Co.'s list .. 80&10%

Steels, Butchers'—
Dick's 30%
Foster Bros. 30%
C. & A. Hoffmann's 40%

Steelyards—.... 30@30&10%

Stocks and Dies—
Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock .. 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stoners, Cherry—
Enterprise ..... 25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Corundum Oil, Double Grit .. 60%
Gem Corundum Axe, Single or Double Grit 60%
Gem Corundum Slips 60%
Gem Corundum Razor Hones 50%
Pike Mfg. Co., 1904 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.00
Arkansas St. No. 1, 5½ to 8 in. 3.50
Arkansas Slips No. 1 ..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. .60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 30¢
Lily White Slips ..... 90¢
33⅓%

Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Washita Slips, No. 2.....60¢
India Oil Stones (entire list).....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit.....33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit.....33⅓%
Quickcut Emery Rubbing Bricks.33⅓%
Hindostan No. 1, R'g'lar.₱ lb 8¢
Hindostan No. 1, Small..₱ lb 10¢
Axe Stones (all kinds).....
Turkey Oil Stones, Extra, 5 to 8 in.....₱ lb 80¢
Queer Creek Stones, 4 to 8 in.20¢
Queer Creek Slips.....40¢
Sand Stone.....6¢
} 33⅓%

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ₱ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots.....₱ gro. $9.00
One gross or more.....₱ gro. $7.20
Lots of 10 gross or more..₱ gro. $6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S..₱ gro. $12.00
Lamoille S. S.....₱ gro. $11.00
White Mountain S. S.₱ gro. $9.00
Green Mountain S. S..₱ gro. $6.00
Extra Indian Pond S.S.₱ gro. $7.50
No. 1 Indian Pond S.S.₱ gro. $7.00
No. 2 Indian Pond S.S.₱ gro. $4.50
Leader Red End S. S.₱ gro. $4.50
Quick Cut Emery....₱ gro. $10.00
Pure Corundum,.....₱ gro. $18.00
Crescent.....$7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%
} 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers.....₱ gro. $9.00

Stops— Bench—

Millers Falls.....15&10%
Morrill's, ₱ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....20%

Straps— Box—

Cary's Universal, case lots.....25&20%

Hame—

Covert's Saddlery Works.....60&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket.....doz. $1.80
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00.....20%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Co., list Jan. 1, 1902.....30&5%

Sweepers, Carpet—

National Sweeper Co.: ₱ doz.
Louis XV, Roller Bearing, Gold Plated.....$120.00
Hepplewhite, Roller Bearing, Silver Plated.....$72.00
Sheraton, Roller Bearing, N'kel.$60.00
Ye Mission, Roller Bearing, Oxidized Coppered.....$36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled.....$36.00
National Queen, Roller Bearing, Fancy Veneers.....$27.00
Loyal, Roller Bearing, Veneers.....$25.00
Triple Medal, Roller Bearing, Nickeled.....$24.00
Marion, Roller Bearing, N'kel.$24.00
Marion Queen, Roller Bearing, Nickeled.....$24.00
Monarch, Roller Bearing, N'kel.$22.00
Monarch, Roller Bearing, Jap..$20.00
Perpetual, Regular B'r'gs, N'kel.$20.00
Perpetual, Regular B'r'gs, Jap..$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled.....$36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned.....$33.00
Auditorium (26 in. case), Roller Bearing, Nickeled.....$54.00
Mammoth (30 in. case), Roller Bearing, Nickeled.....$60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:
Model E, Sanitaire.....₱ doz $25.00
Model A, Sterling.....₱ doz. $25.00
Model B, Sterling, Nickeled.....₱ doz. $23.00
Model B, Sterling, Japanned.....₱ doz. $21.00
Model C, Sterling.....₱ doz. $21.50
Model D, Sterling.....₱ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks.90&5&7½%
American Cut Tacks....90&5&7½%
Swedes Cut Tacks.....90&5&7½%
Swedes Upholsterers' Tacks... 90&50%
Gimp Tacks.....90&50%
Lace Tacks.....90&50%
Trimmers' Tacks.....90&5&7½%
Looking Glass Tacks.....65%
Bill Posters' and Railroad Tacks, 90&50%
Hungarian Nails.....65%
Finishing Nails.....70%
Trunk and Clout Nails....80&5%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks..... 90&6 or 7 tens
Steel Wire Brads, R. & E. Mfg. Co.'s list.....50&10@60%
See also Nails, Wire.

Tanks, Oil— Each.

Emerald, S., S. & Co.....30-gal. $3.40
Emerald, S., S. & Co.....60-gal. $4.25
Queen City, S., S. & Co.....30-gal. $3.65
Queen City, S., S. & Co....60-gal. $4.50

Tapes, Measuring—

American Asses' Skin ..50@—%
Patent Leather.....25@30&5%
Steel .....35 1-3&5%
Chesterman's .....25@25&5%
Eddy Asses' Skin.....40&10@50%
Eddy Patent Leather.....25@30&5%
Eddy Steel.....40@40&10%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list..... 35@35&5%
Pocket .....35@35&5%
Lufkin's:
Asses' Skin.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather....25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓@35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop.....80&2½%
Monitor, Cross Head, &c....70%

Brick Ties—

Niagara Brick Ties.....25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White.....20@20&5%

Hay—

Myers' Hay Tools.....50%
Stowell's Hay Carriers.....50%
Stowell's Hay Forks.....50%
Stowell's Fork Pulleys.....50%

Miniature—

Smith & Hemenway Co.'s.....25%

Saw—

Atkins' Cross Cut Saw Tools.....40%
Simonds' Improved.....33⅓%
Simonds' Crescent.....25%

Ship—

L. & I. J. White.....25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro.....$11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....75@75&5%
Newhouse .....45@45&5%
Hawley & Norton.....65%
Victor .....70&10%
Oneida Community Jump.....50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ₱ doz. $13.25
No. 2, Rat, ₱ doz. $8.50; case of 50 $5.75 doz.
No. 3½, Rat, ₱ doz. $5.25; case of 72 ₱ gro. $4.70 doz.
No. 4, Mouse, ₱ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ₱ doz. $3.00; case of 150 $2.25 doz.

Trimmers, Spoke—

Wood's E I.....50%

Trowels—

Disston Brick and Pointing.....30%
Disston Plastering.....25%
Disston "Standard Brand" and Garden Trowels.....35%
Kohler's Steel Garden Trowels, 5 in. ₱ gro. $4.80
Kohler's Steel Garden Trowels, 6 in. ₱ gro. $6.00
Never-Break Steel Garden Trowels.. ₱ gro. $6.00
Rose Brick and Plastering.....25&5%
Woodrough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern.....50&10%
Western Pattern.....60&10%
Handy Trucks.....₱ doz. $16.00
Grocery .....₱ doz. $15.00
Daisy Stove Trucks, Improved Pattern .....₱ doz. $18.50
McKinney Trucks.....each $10.00
Model Stove Trucks.....₱ doz. $18.50

Tubs, Wash—*No. 1 2 3*

Galvanized, per doz. $4.25 4.75 5.25
Galvanized Wash Tubs (S., S. & C.):
No. 1 2 3 10 20 30
Per doz., net.$5.70 6.30 7.20 6.60 7.20 8.10

Twine, Miscellaneous—

Flax Twine: BC. B.
No. 9, ¼ and ½-lb. Balls .22@24¢
No. 12, ¼ and ½-lb. Balls .18@20¢
No. 18, ¼ and ½-lb. Balls .16@18¢
No. 24, ¼ and ½-lb. Balls .16@18¢
No. 36, ¼ and ½-lb. Balls .15@17¢
Chalk Line, Cotton ½-lb. Balls .....25@30¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....10@18¢
Cotton Wrapping, 5 Balls to lb., acording to quality...11½@20¢
American 2-Ply Hemp, ¼ and ½-lb. Balls.....13@14¢
American 3-Ply Hemp, 1-lb. Balls .....13@14¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).....8½¢
India 3-Ply Hemp, 1-lb. Balls..8½¢
India 3-Ply Hemp, 1½-lb. Balls. 7@8¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls .....9@10¢
Mason Line, Linen, ½-lb. Bls..46¢
No. 264 Mattress, ¼ and ½-lb. Balls .....37¢
Wool, 3 to 6 ply....B 6¢; A 6½¢

Vises—

Solid Box.....60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable.....40%
Standard 40%
Amateur 25%
Columbian Hdw. Co.....40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 5A, $7.00; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting.....25@25&5%
Tiger Machinists'.....40%
Fisher & Norris Double Screw..15&10%
Hollands':
Machinists' .....40@40&5%
Keystone .....65&5@70%
Lewis Tool Co.:
Adjustable Jaw.....30%
Monarch 50%
Solid Jaw.....50%
Merrill's 30%
Millers Falls.....60&10%
Massey Vise Co.:
Clincher 40%
Perfect 20%
Lightning Grip.....20%
Parker's:
Victor .....20@25%
Regulars .....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss .....20@25%
Sargent's 40%
Snediker's X. L.....33⅓%
Stephens' 33⅓%
Williamson Mfg Co, Double Swivel.. 40&5%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz. $30.....25%
Perfection Saw Clamps, ₱ doz....$4.50
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....45&50%

Wood Workers—

Massey Vise Co.:
Lightning Grip.....15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise .....60&10%
Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe.....40%
Parker's Combination Pipe:
87 Series.....60%
187 Series.....60&5%
No. 870.....40%
Williamson Mfg. Co, Double Swivel Combination Pipe.....40&5%

Wads—*Price per M.*

B. E., 11 up.....60¢
B. E., 9 and 10.....70¢
B. E., 8.....80¢
B. E., 7.....80¢
P. E., 11 up.....$1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E., 11 and larger.$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Dis. 15%

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled 55%
Ground 60%
Plain or Unground.....65%
Country Hollow Ware, per 100 lbs. $2.75
White Enameled Ware:
Maslin Kettles.....70%
Covered Wares
Tinned and Turned.....40%
Enameled 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....60%
Iron Clad Ware.....70&10%
Lava, Enameled.....40&10%
Never Break Enameled.....50%

Tea Kettles—

Galvanized Tea Kettles:

Inch.....	*6*	*7*	*8*	*9*
Each	*45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles.....60%
Porcelained .....50&5@50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles.....60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles.....50%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame.$3.25
Red Star, family size, stationary protector $3.25
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$2.90
Cable Cross, family size, stationary protector.....$3.15
Single Zinc Surface:
Naiad, family size, open back, perforated $2.65
Saginaw Globe, protector, family size, ventilated back.....$2.50
Brass Surface:
Brass King, Single Surface, open back $3.25
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.25
Glass Surface:
Glass King, Single Surface, open back $3.25
Enamel Surface:
Enamel King, Single Surface, ventilated back.....$3.25

Washers—Leather, Axle—

Solid .....80&10@80&10&10%
Patent .....90@90&5%
Coil: ⅞ 1 1¼ 1¼ Inch.
10¢ 11¢ 12¢ 13c per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers ...$6.00 5.10 3.80 3.60 3.40
The above prices are based on 5.40¢ off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Wedges—

Oil Finish.....lb. 2.70@2.80¢

Weights—Hitching—

Covert Mfg. Co.....40&2%
Covert's Saddlery Works.....60&10%

Sash—

Per ton, f.o.b. factory:
Eastern District...$27.50@$28.00
Southern Territory.$20.00@$23.00
Western and Central Districts .....$23.00@$25.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....80%
10 to 18.....80&2½%
19 to 26.....80&7½%
27 to 36.....80&2½%
Galvanized:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 16.....72½&10&2½%
19 to 26.....75%
27 to 36.....72½%
Coppered:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 18.....72½&10&2½%
19 to 26.....75&10&5%
27 to 36.....75%
Tinned:
6 to 14.....75&10&2½%
15 to 18.....75&7½%
Annealed, Steel and Tinned, on Spools ..70&10&10@70&10&10&10%
Brass and Copper on Spools... 60&5@60&10&5%
Brass, list Feb. 26, '96.....15%
Copper, list Feb. 26, '96.....25%
Cast Steel Wire.....50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, '03.90&30@90&30&10%

Wire Cloth and Netting—

Galvanized Wire Netting..... 80&5@80&10%
Painted Screen Cloth, 100 ft., $1.10
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft. 3¢
Nos. 4 and 5 Mesh, sq. ft..3½¢
No. 6 Mesh, sq. ft.....3½¢
No. 8 Mesh, sq. ft.....4¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural ....75&10@75&10&10%
Alligator or Crocodile..70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S.....45@45&5%
Acme .....60&10%
Alligator Pattern.....70%
Bull Dog.....70%
Bemis & Call's:
Adjustable S.....40%
Adjustable S Pipe.....40%
Bemis Pipe.....60%
Briggs Pattern.....40%
Combination Black.....40&5%
Combination Bright.....40%
Merrick Pattern.....50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Donohue's Engineer.....40&10%
Eagle .....50&10%
Elgin Wrenches, ₱ doz.....$6.25
Elgin Rethreading Attachment, one die, ₱ doz.....$6.25
Elgin Extra Dies, ₱ doz.....$3.00
Elgin Extra Jaws, ₱ doz.....$1.75
Elgin Monkey Wrench Pipe Jaws, ₱ doz.....$2.10
Gem Pocket.....?
Hercules 70%
W. & B. Machinist:
Case lots.....50&5%
Less than case lots.....50%
Solid Handles, P., S. & W...50&10@60
Stillson 65%
Vulcan Chain.....50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₱ gross, $7.50; ₱ doz.....$0.80

Wringers—

Tuttle Roller Press Mop Pail Wringer, each, $8.00; ₱ doz.....$48.00

Wrought Goods—

Staples, Hooks, &c., list March 17, '02.....90@90&10%

Yokes, Neck—

Covert Saddlery Works, Trimmed..70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters'.....list net

Zinc—

Sheet.....per 100 lbs., $8.00@8.25

For the Table of "Current Metal Prices" see the First Issue of Every Month.